THE GRAY SHEET

Computer Industry

REPORT

INTERNATIONAL DATA CORPORATION

THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No. 24 IDC #18837 March 30, 1999 Molly Upton, Editor

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Digiterati Thoughts

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IDC

The winter conference session is in full swing, and as a change of pace, *The Gray Sheet* thought it worthwhile to capture some of the gleanings from industry notables such as Tim Berners-Lee, Nicholas Negroponte, and key players from Amazon.com, Time, and others. We attended the Internet Commerce Expo (ICE) and Cyberposium.

NEXT: MACHINE-UNDERSTANDABLE WEB SITES

The next step in the evolution of the Web is to recognize that we need to make Web sites understandable by systems, observed Tim Berners-Lee, director of the W3 Consortium and acknowledged inventor of the Web.

Recent W3C recommendations toward this goal are Resource Description Framework (RDF) that provides a foundation for processing metadata and XML namespaces that allow for the use of more than one XML-based language in a document.

"The Web is quickly becoming the world's fastest-growing repository of data. The Resource Description Framework provides the necessary foundation and infrastructure to support the description and management of this data. RDF can transform the Web into a more useful and powerful information resource," Berners-Lee said.

Through its metadata foundation, RDF provides interoperability between applications that exchange machine-understandable information on the Web. It provides metadata capability in a layer above XML that enables applications to understand much of the interpretation of the data without prior arrangements.

RDF should be useful in developing better search engine capabilities, cataloging intelligent software agents to facilitate knowledge sharing and exchange, rating content, describing intellectual property rights of Web pages, and expressing privacy preferences of a user as well as policies of a Web site, among

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others. Berners-Lee said RDF should help develop a Web of trust whereby users and agents can know what is signed and what they can use.

Berners-Lee is urging industries to produce their RDF vocabularies.

XML Namespaces

XML namespaces enable a system to process an invoice without knowing the particulars of the items such as jet engine bolts, for example. In particular, a namespace "allows authors to mix two or more XML-based languages in one document without conflict or ambiguity, thus promoting the modular development and reuse of XML languages and applications," according to W3C.

"An XML namespace is a collection of names" identified by a uniform resource identifier (URI), which is "used in XML documents as element types and attribute names," W3C explains. Namespaces provide a built-in means of declaring "global" attributes (unavailable in XML 1.0). The other partitions are "all element types" and "per-element-type." Basically, this partitioning lets machines know what they are dealing with, and is a logical extension of the tagging principles of XTML.

W3C published its recommendation for RDF schemas in which it describes the RDF schema type system as "similar to the type systems of object-oriented programming languages such as Java. However, RDF differs from many such systems in that instead of defining a class in terms of the properties its instances may have, an RDF schema will define properties in terms of the classes of resource that they apply to .... One benefit of this property-centric approach is that it is very easy for anyone to say anything they want about existing resources, which is one of the axioms of the Web."

These recent recommendations add some features of programming languages and also embrace the concept that the information should be treated not as a remote procedure call but as "the transmission of an expression in some language."

In a trip through the accomplishments of the W3 Consortium, Berbers-Lee reminded the audience at Internet Commerce Expo of the virtues of style sheets in serving multiple types of access devices and lauded XML as an enabler of defining, validating, and sharing document formats on the Web. XML is based on Standard Generalized Markup Language (SGML) and allows for vertical industries to construct their own XML flavors.

Practice Web Hygiene

On more mundane topics, Berners-Lee urged Webmasters to beware of "Web rot." People should practice Web hygiene and keep it clean, he intoned. Web rot can occur in several ways:

- Links to no longer existing pages
- Sites that cannot be bookmarked because they are reached via a form
- Accelerators that, unbeknownst to the user, deposit the searched items into shopping carts

There are supposed to be no side effects to devices such as accelerators, he remarked.

Webmasters should carefully select URLs that they can live with a long time, because once they eliminate the URL, anything linked to it is no longer functional. If a URL "breaks," it should be of the same level of concern to the CEO as if the building fell down, Berners-Lee stated. He also excoriated the widespread use of lengthy URLs that are descriptions of how the site was coded. You know the type: cgi/bin gobbledygook.

Internet Population Underestimated

Future populations on the Internet, implications for extended models of subsidized devices, retail's relation to the Web, issues of taxation, and physical delivery of goods ordered via the Web were on the mind of Nicholas Negroponte, director of MIT's Media Lab. In a recent speech at Internet Commerce Expo, he explored these themes.

The forecasts of the number of Internet users by yearend 2000 are seriously underestimating the Internet adoption rate outside the United States, according to Negroponte, who posits there will be a worldwide total of 1 billion users by the end of 2000. Factors boding well for widespread adoption include culture as well as developing countries' demand for fundamentals such as education.

Negroponte said that when populations are desperate for fundamentals such as education, a medium like the Internet that can provide such services is likely to be widely adopted. For example, in Mexico, for every paying account, he suspects there are in fact six users, including neighbors and friends who share the bill and the usage.

Although the northern European countries have a higher per-capita rate of citizens using the Internet than do southern European countries, Negroponte thinks the Mediterranean cultures could become digital cultures. For example, he said, in Italy, where the small business is held in high esteem, there is a "well-groomed" underground economy and a healthy disrespect for authority.

Latin America, with only two languages, is a likely rapid adopter of the Internet also, he said. Uruguay, for instance, has a totally digital phone system, so some infrastructures are surprisingly ready.

There's another aspect to Web population. We're probably blissfully unaware of the growing army of things that connect to the Internet, and Negroponte estimates that by the end of this year, the number of connectables will outnumber people using the Internet. The program at the Media Lab devoted to kitchens and their contents is dubbed "counter intelligence." In five years, the primary semiconductor content in the home will be in toys, he predicted.

Gating Factors

Negroponte mentioned the lack of the concept of debit/credit and physical delivery challenges as two of the gating factors to widespread adoption of e-commerce throughout the world. Much of the world's population relies on barter and exchange of services. One of the issues arising from the consumer adoption of buying over the Web is the changing metrics of cost incurred by delivery companies, he observed (see *The Gray Sheet* 33.15). There is a need for innovation in physical delivery.

If you think e-commerce is interesting in its current guise, just wait. Look for more goods subsidized by services, he suggested. We now actually have an era of the "free" PC — free, that is, if one doesn't mind giving away tons of demographics and being bombarded by ads and/or committing to an Internet subscription service. (Free-PC.com, was the first to announce free PCs to those providing demographic information, and now DirectWeb plans to give away free PCs, initially in the Philadelphia area, in return for subscriptions to its Internet access service.) Applying the concept to other realms, Negroponte suggested that perhaps insurance companies could subsidize the price of autos.

On the relationship of retail and the Web, Negroponte mused that the Web may be turning traditional brick-and-mortar retail into "indoor advertising." Many audience members indicated they, too, had visited stores, appraised particular items, and purchased them on the Web. And, he continued, because pharmacies lack the panache and cappuccino atmosphere of bookstores, pharmacies could find their traffic dwindling once the online drugstores gear up for action.

While we're enjoying the moratorium on sales taxes on commerce over the Internet, the fact is the states and nations based on value-added taxes are deprived of revenues. Perhaps instead of relying on merchants to be the tax collector army, the delivery companies could be the tax collectors, Negroponte opined.

Former speaker of the house, Newt Gingrich, also added his opinion on reimposing sales taxes on e-commerce, suggesting the current moratorium be extended from 2001 to perhaps 2005–2006. At the point when e-commerce reaches the equivalent of 12–15% of U.S. GDP, sales taxes should be reimposed, he suggested. But by IDC's calculations, e-commerce volume could reach 12% of GDP as soon as 2003–2004. Anyone for taxes in 2002?

Players Muse on Leverage, New Models

Branding, new business models, integration of commerce with communities of interest, first-mover advantages, and evolution of businesses on the Web were a few of the topics covered by panelists at Cyberposium '99 sponsored by the Harvard Business School. The conference videos are available at **http://www.cyberposium.org/web_99/conference/vidlib.htm.**

In a jam-packed weekend in which frank discussions and answers replaced the usual vendor-speak, *The Gray Sheet* found the following nuggets:

- Early movers profess there are advantages to being first on the turf: currency, alacrity, and inexpensive branding.
- Barriers to entry are rising, and the "old world defenders" may be ill equipped for the next round.

- There are two sides to stickiness.
- Existing software players look to new models.

New Players Hold the Currency

Existing "old world" companies may lack the currency to be on the acquisitions prowl in the Internet world. Being judged on quarterly P&Ls hampers such companies from being able to invest heavily in Internet plays. Time Inc.'s Julie Fenster, vice president of business affairs, admitted the quarterly judgments limit Time Inc.'s ability to have the currency to buy Excite, for example, because it is not perceived and valued the same way.

Call it a barrier to success, added @Home Network's Charles Moldow, vice president of sales and marketing.

It looks as if the barriers to entry have exploded from nearly zero to quite steep, unless one spins off a .com unit that's unfettered from the parent and can gather its own stash of cash.

(It appears the corner office is listening; reports in *The Wall Street Journal* indicate Time Warner is contemplating a spin-off in the Internet space, with CNNfn a likely candidate.)

The value of being a pioneer, who admittedly still gets arrows in the back, is the ability to bet your company, added Moldow.

Usually in technology discontinuity, we see new leaders or upstarts rather than those defending assets. But could assets (customers, distribution chain) be liabilities? pondered moderator John Hagel, principal of McKinsey.

Turf Advantage to the Early Movers

Not surprisingly, many of the panelists in a session titled "Attackers vs. Defenders: The New Media Wars" saw a clear advantage to being on the turf first. Amazon's John Risher, senior vice president of product development, cited user tendencies to return to four or five sites and said the user may not be willing to fill out information for additional sites, leaving the advantage to the early mover. (Is the Net version of the parable that the early bird gets the forms filled?)

(The advantage of filled-out forms could be diminished through developments such as Novell's Digital Me or QuickBuy's buycon, but the early sites will retain an advantage in their ability to provide personalized service and create customer loyalty through past user experiences.)

Pace Is a Race

AOL Bertelsmann's Chris Hill was succinct: "You wait, you die," adding that brands do win and it's critical to build brands quickly.

The race is on for branding. Market share will never be as cheap as it is today, remarked Amazon's Risher. He explained although Amazon has spent heavily in building the ability to deliver "great service," starting to build a brand now would be more difficult and more costly because competition

exists. "It is far riskier to be second," he added, "although being first means having to roll your own" technology, he said.

(*The Gray Sheet* notes that Amazon.com is now acquiring interests in retail arenas relatively new to the Web, such as 40% interest in Drugstore.com and 50% interest in Pets.com. Jeff Bezos, president of Amazon.com, learned some lessons from his stint on Wall Street. His company has cleverly amassed both capitalist weapons useful for acquisitions — $1.25 billion in cash from a bond offering — and, of course, its lofty market cap.)

There was general consensus among various panels that at this point, branding can be enhanced/ reinforced by use of traditional media.

Stickiness — How Sticky?

There was some debate on the virtues of and implementation of a site's stickiness or ability to keep a customer at the site. Risher noted there is need for a balance to create a community that will stick around, but sometimes it is best to move them to another site. He mentioned Amazon was preparing to roll out Junglee, a comparison shopping tool it acquired. "It's shortsighted to want to only keep them longer, but it is risky to let them go." Risher didn't mention if Amazon is negotiating with the sites to which it refers customers for a piece of the action. Moldow said he thinks the issue is not stickiness but relevance and utility.

If you think today's e-commerce is "cool," just wait; think in terms of delivery in bits of what was previously shipped as atoms, observed Risher. In this case, e-commerce transitions from the

Power to the Shopper?

Recently, Michael Sullivan-Trainor, IDC's vice president of Internet research, came across two attempts to enable buyers to enter personal data once and use it repeatedly at different sites for purchases. These efforts by Novell and QuickBuy are akin to the digital wallet concept that hasn't so far emerged as a driving force.

"Driven by Novell's NDS directory, Digital Me is a software program that allows users to create digital ID cards that contain their identifying information and preferences. These cards are portable throughout the Web and can be used to provide the information most Web sites require to register for access or services.

"Digital Me is controllable by the user. He or she determines just how much identity information is revealed to whom. The data provided is also traceable, so the user can check out what the Web site does with the data," Sullivan-Trainor commented.

The approach used by QuickBuy's Shopper and buycon requires adoption by particular merchants and a plug-in or thin client on the user's PC. The buycon intelligent icons contain the information needed to make a purchase, which the shopper drags and drops onto the "shopper," which has a shopping cart holding area and a credit card digital wallet.

order-taking for physical delivery to the actual delivery mechanism. Many agreed the music industry is the next forefront.

Integration of commerce and communities will be the next step. Barry Parr, IDC's director of Internet and eCommerce Strategies, noted this may be the third phase of the commerce Internet: content, commerce, and community.

As communities of interest emerge, they represent key buying opportunities for merchants whose goods align with the communities' preferences. Many community sites are endeavoring to broaden their revenue streams. Some are adding e-commerce opportunities at their site, while others are looking beyond advertising to include a commission when promotions are offered to their groups and/or when their members visit or buy at other vendors' sites.

Sites are able to develop audiences by making alliances and links without paying a lot of money — at least in this first round — according to panelists, who represented both companies in the IT industry and those who started as communities. The next round consists of sorting out the payment models, with payment for performance and commissions on referrals two of the likely scenarios.

And things may be different from what they seem. Quote.com's new president, Robert Honeycutt, said his community's identity is not who the user is but who the user wants to be. He sees potential e-commerce opportunities arising from bringing together investment counselors and investors. In the future, it is conceivable stock trades could be free, subsidized by ad revenues, he said.

New Models

Different levels of service are likely, according to Cisco's Amir Harmna, managing director of the Internet Business Solutions Group. He said he sees the Internet taking the cable model with different price bands. At one level, everyone can participate; at another level, high speed costs extra, and some will pay for super-secure connections.

New business models were also mentioned by some speakers. Baer Tierkel, president of PeopleSoft Business Network, indicated his company is not only aggressively pursuing the applications service provider (ASP) business but also positioning itself as a distribution channel by which other applications can reach PeopleSoft's potential coverage of 30 million end users. He envisions building networks of merchants such as travel and human resources with its range of benefit suppliers (including 401k, insurance, and healthcare) and offering comparisons of products. "The ubiquitous IP concept is stunning," Tierkel noted.

INTERNET INSIDER

Occasionally, *The Gray Sheet* presents an array of topical thoughts ruminating in the minds of IDC analysts. The following sections include such an array.

USERS WILL DEMAND THE BEST OF BOTH WORLDS

E-mail has always been the Internet's "killer application." The winning services will give users the best of both worlds: the ease of use and ubiquity of Web-based e-mail and the control and speed of a desktop e-mail application. AOL's Netmail already gives AOL users access to their e-mail from a Web interface without using AOL's client software. Geocities (now part of Yahoo!) offers free e-mail via the Web and POP.

Now, Microsoft's latest Outlook Express lets Hotmail users download mail with a desktop client. Other Web e-mail providers will certainly have to support Outlook Express to remain competitive. E-mail is the most personal application on the Internet, and users will insist on this degree of access flexibility in the future. Every software company already has an Internet strategy. Does your Web site have a desktop strategy?

— Barry Parr

THE FUTURE OF THE INTERNET: BROADBAND CONTENT

We have seen the future of the Internet ... and the future is broadband content. By this year's end, broadband content provider On2.com will have launched its first of three Web sites developed for people who get broadband direct into the home.

One of the premier sites, On2travel.com, will provide surfers with a real-time, broadband auditory and visual experience of where they're going before they get there. Content includes video clips of the places they'll visit and a panoramic, 360 degree view of the hotel they'll stay in or the cruise ship on which they'll travel. In addition, users can experience the sounds and views from underneath a waterfall, the sights and sounds of a Paris boulevard, or a noisy street corner in Morocco.

This is TV-quality information on demand, with the usual Internet-type information that we've grown accustomed to as well: feature stories on travel destinations, searchable databases of places to go, travel-related videos, and destination reviews as well as vacation deal comparisons and criteria rankings. And, of course, e-commerce capabilities (airline tickets, hotel rooms, rental cars, etc.). The only requirements are 384kb and two weeks of vacation time.

— Juliana Nelson

TRADING COMMUNITY WARS

Trading communities, the aggregation of distributors and suppliers with catalog-type Web sites, have existed for quite a while. The trading community landscape is polarizing the e-commerce software vendors that want to own a trading community and like-minded suppliers that want to set up easy-to-use and easy-to-access product-specific sites.

On one side of the field are Ariba and CommerceOne, two of the more vociferous e-commerce/e-procurement software vendors. In an effort to differentiate themselves, these two companies are setting up sites with a very broad range of indirect goods from paper clips to computers.

On the other side of the field are industry-specific sites such as MetalSite (powered by Trade'ex) for the steel and metal industries and SciQuest (powered by Lante Corporation) for the scientific products industries. The industry-specific sites have customer services such as related content (access to relevant trade journals), collaborative capabilities (discussion groups), and e-commerce capabilities. The generic sites provide one-stop shopping with e-procurement functionality but will constantly struggle for mindshare as generic sites. And how does a site with a 5 million SKUs provide meaningful content about competitive products?

A community is a collection of like-minded individuals. A focus on such a community is the formula for success.

— Joan-Carol Brigham

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IDC's forecasts of IT opportunities

Vol. 33, No. 23 IDC #18796 March 27, 1999 Molly Upton, Editor

Microsoft Does "The Vision Thing," Plots Road Ahead

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IDC

What will be Microsoft's future role in Internet commerce?

Undaunted by the Department of Justice (DOJ), Microsoft recently unveiled at its Commerce Solutions Briefing its vision of emerging e-commerce markets and its plans to drive new levels of growth. The new vision did not amount to a radically new business model, but it did push the company's desktop orientation further toward internetworking, infrastructure services, and middleware — most importantly, in the guise of its proposed "BizTalk" framework for cross-platform communications.

From the new perspective, Microsoft would look less like a market owner and more like a market maker. If this shift occurs, a key factor in its success may be the company's ability to change its internal culture and its approach to industry relations and alliances. Microsoft will have to walk a tightrope between proprietary and open solutions and will need to clarify where the boundaries exist. The interesting catch is that, regardless of the DOJ, the size of its ambition may leave the company with no choice but to make the cultural changes. Microsoft, for once, needs friends.

Despite the recently reported claims of its defense counsel this past winter, Microsoft suffered serious damage to it public image. At times, the company has seemed insular, myopic, and megalomaniac, somewhat like the Cyclops that was blinded by the crafty Ulysses (a role for which leading players are auditioning). That picture of a bumbling giant is a caricature, not a prophecy. However, given the problems associated with the continued delay of Windows 2000 (not to mention Office 2000) and strategic plans announced in recent months by its competitors (e.g., IBM), it was imperative that Microsoft launch a preemptive public relations strike to restore confidence in its ability to reach the next plateau in the Internet's evolution.

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Microsoft's Commerce Solutions Briefing held in March brought out inevitable comparisons with Internet D-Day in 1995, for both its belated acknowledgment of a shift in market forces and the reminder that when Microsoft finally decides to move, it can be "a force to be reckoned with."

The announcement's reception was strangely muted: leading papers put the story on their inside pages, trade journal editors couldn't agree on the spin, and analysts were divided in their assessments of whether the message was timely or too late, innovative or old hat, focused or fuzzy. To be sure, there were so many pieces to the puzzle that it was hard to see it whole.

Microsoft approached the Holy Grail of a "total e-commerce solution" from nearly every conceivable perspective, stretching across what are actually several distinct markets, including:

- Platform
- Application
- Network
- Commerce services

Furthermore, though most of the pieces mentioned have been in development for some time, they are still works in progress that will not bear fruit for another year.

Nevertheless, visions have a purpose, if only to show that the giant is not blind. Microsoft's vision is actually very impressive, comprehensive, and even innovative to a modest but significant degree. The key innovation Microsoft announced was BizTalk, which it calls "a new cross-platform e-commerce framework" that it will build into its software and services. In this issue, *The Gray Sheet* tries to place BizTalk in context and assess the implications for Microsoft's potential partners among e-commerce network service providers.

THE CHALLENGE

Paranoia (which is a good thing, we're told) sees challenges everywhere it looks. But for our purposes, we can divide Microsoft's challenges into two general areas.

Beyond Client/Server, into the Network

The company's main strategic issue has been how to replicate its success on the desktop in a world dominated by the Internet. Whether Microsoft likes it or not, the challenge comes from a network-centric model of distributed computing wherein specialized servers, drawing

on remote resources, enable end-user clients to be relatively indifferent to the underlying operating system, which then becomes less of a determining or differentiating factor in deploying a business solution.

Given this scenario, simply incorporating the browser into the operating system makes it something of a Trojan horse because users are now free to roam networks, where the real action is. Microsoft's assumption that users would naturally use Internet Explorer to hang out at MSN sites was a bit smug, or overly self-confident.

Browser as Socket

The challenge, then, is to push further into the network by forging a stronger link to the middleware that offers a richer range of communications between distributed services. The browser, for example, would then become less of a window and more of a socket to a network connection or pipeline for automated application-to-application data exchange, from desktop to desktop.

If the connection were built into the architecture (NT, Site Server), this could be a compelling reason to standardize on a Windows platform. However, now the emphasis is less on the operating system and more on the architecture that establishes links to the world beyond. This is roughly the rationale behind Microsoft's new BizTalk, which is slated to take a major role in Microsoft's development of componentized, modular middleware for business applications.

Speaking in Tongues: Scale Requires Interoperability

The other half of the challenge for replicating Microsoft's business model is scale. The NT (Windows 2000) platform, which is supposed to lead the company's charge into the network space, has well-known problems in this respect. Solving these problems, especially for transaction processing, will be crucial to the company's e-commerce strategy. Every aspect of Microsoft's e-commerce strategy touches upon the NT-versus-Unix war.

In an even broader sense, however, the mass markets envisioned for Internet e-commerce will call for not just high volume but an unprecedented diversity of business transactions and applications. Real-time exchanges in many-to-many trading communities, or agent-assisted comparison shopping in virtual marketplaces, will require high-level, standards-based interoperability among participants who can engage in trade without needing previous agreements or special communications set up. Such scenarios are still visionary, but it will pay service providers to develop e-commerce strategies that will be prepared for the potential. For commerce solutions that will scale, these are also compelling reasons for the hooks that link the data exchange pipeline not to be proprietary.

This challenge must be met at different levels, as Microsoft's evolving architecture proposes to do. As IDC's software analysts have noted, "to achieve the next level of distributed computing — the paradigm that will allow for literally millions of machines to interoperate as both clients and servers on a worldwide heterogeneous network — more advanced and yet simpler tools are needed" (see *The Software Components Market: Its Status and Future*, IDC #13847, July 1997). We see the trend in narrowly purposed appliance servers and the reemergence of single-function business applications out from under "all-in-one" monsters.

For Microsoft, the key technology is object-oriented and component-based software development. Of course, the company has promoted its Windows-based solutions (e.g., COM and ActiveX) in contrast to the CORBA- and Java-based solutions advocated by Sun, IBM, and others. Recognizing that Internet scale needs cross-platform interoperability, both sides have made concessions or inched closer together.

Microsoft's announced decision to base the framework and forthcoming server BizTalk on XML signals a new stage of its strategy in this area, the implications of which are potentially far-reaching. Basing BizTalk on XML raises the possibility of more open, standards-based application integration while at the same time speeding Microsoft's time to market with implementations that become de facto leading candidates for standards — a game that Microsoft plays well.

Whether it will work this time depends on many factors. The following section gives an overview of the context, along with comments on new items or directions. Next, we focus on the implications for providers of value-added network services emerging from BizTalk and the company's role as a market maker.

THE VISION

In simple terms, Microsoft's e-commerce vision covered demand, supply, and the means to bring them together. The Solutions Briefing called these components portal, platform, and partners.

- **Portal.** The strategy for driving demand will revolve around a revived and heavily promoted Microsoft Network, now repositioned as a full-fledged portal for both consumers and small and medium-sized enterprises (SME). Prior to last week's briefing, Microsoft was calling this MSN.Commerce.

- **Platform.** On the supply side, Microsoft will support that demand primarily through software and services that provide the infrastructure for commercial activity — on MSN or anywhere else, of course. This support encompasses NT and BackOffice territory (DNS.Commerce, for "digital nervous system"), along with Site Server Commerce Edition. This last item, however, will split into two, creating the BizTalk function, which blends into the third strategic area, DNA. (Microsoft has become fond of biological metaphors.)

- **Partners.** In this area, previously called DNA.Commerce, Microsoft trotted out its long list of alliance and solutions partners, including new ones like PeopleSoft and MasterCard. More important, however, it became clear that this is the area in which the company's extension into the network and its success as an e-commerce power broker will be played out. (DNA becomes distributed internetworking architecture.) In the future, Microsoft's Value Chain Initiative will be tightly linked with its Commerce Interchange Pipeline, which in turn gets folded into BizTalk.

Overall, Microsoft's message was this: Though Internet e-commerce has proven its enormous potential, it has also proven to be costly and complex to achieve the smooth integration that will provide returns that outpace the inevitable pressure on margins that comes from more efficient markets. This is the Internet's Catch-22. To sell more software and services, Microsoft sees a need to stoke up the markets by making it easier to integrate systems and exchange transactions.

In briefings prior to the public event, Microsoft officials said that the company would address this obstacle by basing its e-commerce strategy on two major bets: XML and modularized software components that eventually replace proprietary APIs, facilitate cross-platform communications, and support rapid development.

At the Solutions Briefing, Chairman Gates asserted that though BizTalk (which combines these two bets) would be built into all levels of Microsoft's e-commerce solutions, it would not be based on Windows-specific specifications. So far, it appears that the company is saying the right things about where it will

play in driving XML standards. Nevertheless, there remains plenty of potential for tension between Microsoft's different roles as portal and platform, or infrastructure provider and market maker. That tension will likely be played out in the middle areas concerned with BizTalk and service alliances, where what Microsoft does could either remove friction from the marketplace or increase it.

Portal: MSN Feeding the Feeding Frenzy

Microsoft's greatest asset has always been the sheer number of its end users. However, as the company turned its focus to moving up market in the enterprise computing space or extending Windows to other media, it seemed to have lost sight of the consumer migration to Internet mass marketplaces. Meanwhile, MSN languished from inattention. Microsoft now seems to recognize the key role of aggregation strategies — for both content and customers — in these markets. The main idea here is to stimulate more cross-pollination among its existing MSN sites.

Microsoft did not address the revenue model for MSN, but it is sure to be built on a complex web of services, including affinity advertising and sponsorships, site links, and payment transactions. The key aggregation engine will be MSN's Small Business Services, which will allow participants to publish to and leverage the co-marketing services of MSN's LinkExchange. For consumers, the company will finally (?) deliver its Passport service for one-stop registration, privacy, and security assurances. An electronic wallet and relationships with Clarus and MasterCard will supplement the flagging Transpoint payments initiative. In addition, the acquisition of CompareNet will provide product searches and comparative shopping.

Clearly, the goal is to create a feeding frenzy that Microsoft can further stoke by looping back all the marketing data extracted from the activity in the form of customization, personalization, and targeted marketing tools.

Platform: From Servers to Services

The next version of Site Server 3.0 Commerce Edition will be called Enterprise Commerce Server. Though Microsoft continues to position NT for enterprise computing applications and has many large reference accounts conducting e-commerce on the platform, the clear target for its announced strategy is small businesses, and the aim is to bring "millions" more online.

The announced server enhancements are designed, in particular, to allow these businesses to participate in the portal activities described above. The enhancements include support for applying more complex and flexible business rules to transactions, publishing catalog data, analyzing results, and dynamically using the results to refine and selectively deliver content. Each of these functions will draw on the semantically rich metadata enabled by XML.

The biggest change, however, is that the core communications engine of SSCE will be removed to become the basis of BizTalk, which in the weeks before the Solutions Briefing was called the Commerce Interchange Server. BizTalk is the successor to SSCE's Commerce Interchange Pipeline (CIP), which Microsoft had previously described as the most significant addition to SSCE 3.0 — "the environment for the automated exchange of business documents (e.g., purchase orders and invoices) between a company and its trading partners" and for "developing interoperable trading applications."

If this sounds like electronic data interchange (EDI), that's because it is, or nearly so — and potentially much more. BizTalk takes on CIP's role of handling data exchange interfaces, including mapping and translating data schemas and formats, parsing and routing messaging services, and wrapping software objects (COM objects) for interapplication procedure calls. So, BizTalk is a rules-based processing engine and an application-to-application integration tool. At the Solutions Briefing, Bill Gates was calling it the "glue" that holds e-commerce activity together (which is how the company used to describe its Component Object Model).

The interesting question, then, is to what degree BizTalk encroaches upon the traditional territory of the EDI VANs. In pre-event briefings, Microsoft spoke of BizTalk interfacing with the VANs. We return to this question later.

Partners: Value Chains or Chained to Value?

Because BizTalk obviously will become crucial to how Microsoft's platform customers' systems talk to other network-resident services, it also will become central to how Microsoft talks to its alliance partners. The company identified the following four groups of alliance partners, emphasizing its intention not to compete in their space:

- Microsoft Certified Solution Providers, including Web developers, now some 15,000 strong, and a key source of market power
- Eight leading systems integrators, including Cambridge Technology Partners, KPMG, US Web, and others
- More than 100 ISVs participating in its Value Chain Initiative (VCI), which is focused on developing industry-specific supply chain solutions for products and services
- More than 70 ISPs that offer hosted e-commerce solutions, including Digex, Concentric, Icon CMT (a.k.a., Qwest), GTEI, UUNet, USinternetworking, and others

Most of these relationships, of course, are not new and have been developing for some time. However, BizTalk and the Solutions Briefing do highlight one interesting development; Microsoft previously identified the Commerce Interchange Pipeline as "the key technology" for its VCI — a role that now falls to BizTalk. Some background here is in order.

The availability of vertical industry commerce applications has been seen as one of the primary enabling factors in driving the growth of Internet commerce among smaller and middle-market businesses — a prime Microsoft target, as noted. One line of thinking has been that availability would come as vendors of large integrated application suites, such as ERP, adopted new distribution channels — for example, the emerging hosted application service providers (ASPs). This might involve decoupling the suites into single-function applications.

Another view holds that the key to availability is the software revolution in component- or object-based development, which makes possible a clean-slate approach to creating next-generation, single-function applications that are infrastructure-neutral and plug-and-play in nature. This takes us back to the alternative approaches to component technology advocated by Microsoft and by IBM, Sun, and others.

Obviously, Microsoft's Value Chain Initiative will be a major, if not the primary, means by which the company will attempt to drive standards for componentized commerce applications, with XML adding

speed to market to the attractions of ease of use and reuse of common objects. Does this mean that Microsoft will attempt to co-opt the XML standards process with proprietary Windows solutions? Given the track record, suspicions are not out of the question. However, the company professes to take a neutral, peacemaking, translating role in this process, aiming to drive adoption of only interoperable schema, not application-specific implementations such as document forms.

For now, Microsoft is saying the right things, and as we commented at the outset, there is good reason to believe that its grand ambitions as a market maker will provide the motive for supporting open, platform-independent solutions. However, it can still, and no doubt will, make a case for Windows and BackOffice as the best platform for platform independence. As usual, Microsoft will seek strength in numbers, trying to make a technology push look like a market pull and hoping that if it fosters hundreds of supply chain implementations, users will become "chained" to the value of BizTalk as a universal translator that takes away the pain of e-commerce integration.

IMPLICATIONS

To sum up so far, Microsoft will attempt to push its client and server platforms further into the network, colonizing the middle tier of distributed e-commerce services by establishing a modular pipeline connection that relies on XML as the lingua franca for facilitating data exchange and application integration. The e-commerce strategy's primary targets appear to be small and medium size enterprises, for which the major obstacles to participation in Internet commerce are the costs of systems integration and market visibility, and consumers, who seek a more seamless, centralized Web experience. Microsoft will make a direct play for business-to-consumer markets while addressing business-to-business markets indirectly.

The Vision Thing

As a vision, Microsoft's announcements lacked the coherence that would help one see the forest for the trees. But the all-fronts blitz should achieve the immediate purpose of grabbing some mindshare and perhaps giving customers a reason to wait and see before choosing an alternative path. True, Microsoft has been a bit late to the party, but most parties take a while to peak. First-mover advantages in a fast-moving space can evaporate quickly, and by virtue of its installed base, Microsoft has been in a position where it can afford to take its time to get it right. This is particularly true in its chosen markets, where it is a virtue to be a jack of all trades that offers broad coverage, packaged solutions, and ease of use rather than cutting-edge solutions that offer competitive advantage.

Visions lack detail, however, and having whetted the appetite, Microsoft needs to come forth with a stream of clarifications and programs. Its heralded reorganization, expected this month, should help considerably. The four new divisions focused on customer segments, as reported in the press, closely parallel the announced e-commerce strategy segments and appear to place a high level of emphasis on getting developers to buy into BizTalk.

Bringing Up XML: High Roads and Low Roads

Microsoft needs to fill in the detail about BizTalk: how it will work, how far it will reach, how it will be developed, and how customers and partners can plug into it. These are both near-term and long-term questions.

BizTalk represents a strong vote in favor of componentized software, XML, and standards for open communications. There are other routes to these ends, however, and no one will be blamed for being skeptical of Microsoft's intentions until they are proven. Still, in contrast to Ariba Technologies' cXML and Ariba.com Network (announced the same week), for example, Microsoft appears to be taking the high road; Ariba's drastic attempt to change the direction of its business model toward a similar goal looks like a proprietary, halfway-house solution. Interestingly, Ariba was conspicuously absent from the list of supporters for BizTalk, which included Harbinger, Sterling Commerce, and Commerce One, among many others. Just how Microsoft works with these key partners will be a telling sign of its long-range designs.

Implications for Network Services

Finally, despite Microsoft's claim that it will not compete with its partners, the company's strategy leaves plenty of room for tensions to arise between its roles as infrastructure provider and as market maker. This is not uncommon in the e-commerce space, in which that potential crops up everywhere and has become a fact of life.

E-Commerce Web Site Hosting

It is worth noting that the Solutions Briefing said little about Microsoft's intention to host commerce sites for its MSN portal. In this case, there is probably more room for synergy than conflict with Microsoft's many ISP partners. The ISP channel is key for the NT platform — in fact, the delays and uncertainty around Windows 2000 make for a rich NT outsourcing opportunity for these ISPs. Also, because small businesses will be able to publish their sites to MSN from their ISP sites, the portal's Small Business Services may actually increase the opportunities for ISPs. ISPs that have a convincing story to tell for hosting NT/Windows solutions — and perhaps even a relationship with MSN — will be well positioned to catch the next wave.

Internet EDI

On the other hand, BizTalk, at this "visionary" point, looks a lot like an Internet EDI engine that might accomplish much of what is done by the Web-enabling and gateway software the VANs are now deploying to extend the reach of their EDI customers (e.g., GE Information Services' new Application Integrator and Enterprise gateways). As Microsoft moves outward to the network, the traditional players are moving closer to their customers' systems integration requirements.

Similarly, one aspect of Microsoft's strategy, mentioned in pre-event briefings but not covered in its March 4 announcements, was its intention to cultivate extranets and business-to-business trading community networks — another new market opportunity for the VANs.

With VANs like Sterling Commerce and Harbinger as announced partners, one expects that Microsoft has given thought to where the boundaries lie. Indeed, Harbinger's recently announced "Pipeline" connector and portal strategy sounds very much like Microsoft's pipeline and portal strategy. There is a gray zone in this area that could become a closely patrolled DMZ. On the other hand, there may be room for synergies here, too, especially because the VANs have extensive experience managing trading communities, and they could enter the hosting business as well. (In fact, GEIS has already.)

One of the most interesting implications of BizTalk will be how these relationships play out. Microsoft is indeed moving from software to services, but on the whole, IDC expects that the company will have enough on its plate to keep it from venturing too far into the network.

By Stephen Murray, Research Manager, Extranet Commerce Services

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No. 21-22 IDC #18795 | March 23, 1999 | Molly Upton, Editor

Internet Insights, 1999

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IDC

The Internet is the equivalent of the exploration (and exploitation) of the new world. The opportunities are vast, and suppliers as well as the players will benefit. Despite the hype about the advantages of early market presence, the hot growth period has just begun.

Think of it: The Internet currently has about 142 million users and more than $50 billion in e-commerce. But the "real revolution" is just starting. By the end of 2003, IDC expects the number of Web users to jump to 500 million and Internet commerce to reach a mind-boggling $1.3 trillion.

With this amount of dynamism in the market, vendors need to identify and meet the changing needs of the new Web user. Users need to realize the Internet is a multifaceted tool for future competitive strength.

Do the math. More e-commerce, more users, more devices, more access, and more content require more infrastructure in the form of access devices, services providers, servers, storage, network infrastructure, and management, to name a few.

This issue of *The Gray Sheet* provides a panorama of the Internet's growth, impact, and opportunities.

Web Spending

IDC's U.S. Web Spending Model estimates that corporate spending for Internet-related products and services will exceed $85 billion in 1999 and increase at a compound annual growth rate of 34% to more than $203 billion by 2002, according to *Internet Futures Spending Model, 1997–2002: Business Gears Up for E-Commerce* (IDC #17999, January 1999). (See Figure 1.) This forecast covers spending for intranet, extranet, and Internet commerce.

THE GRAY SHEET

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The pace of the race to jump aboard the Internet has been horrific, as all of us trying to catch our breaths can testify. In 1998, U.S. corporations increased their Internet-related spending by 55%.

By examining the waves of computing, one can understand the ineluctable force of the Internet in bringing computing in whatever form to the masses (see Figure 2). One is reminded of Marshall McLuhan's edict: "The medium is the message." The opportunities are rife — whether one looks at the amounts industries are planning to spend (see Figure 3) or at participation by industries (see Figure 4).

Although manufacturing obviously is and will be the largest spender for Internet-related equipment and services (see *The Gray Sheet* Vol. 33. No. 18), some of the other industries also bear inspection. For example, many of us need to revamp our old opinions of the local electric company as a stodgy, dull entity. In fact, with deregulation, it is anything but. Many utilities are starting to capitalize upon their assets, including the following:

- Large customer bases
- Billing and customer service facilities
- Access to the "last mile" to the home

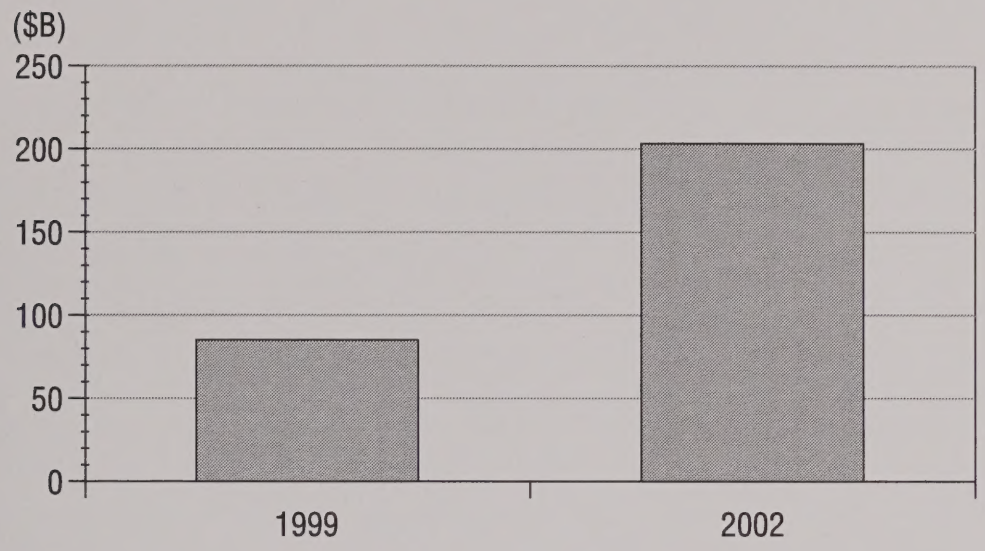
In fact, some are taking on the role of ISP to their constituents, while others are participating in bill presentment and payment over the Internet. Others are contemplating leveraging their customer service facilities by providing such services to other firms. So although the total numbers of Internet expenditures may pale in comparison with those for manufacturing, in fact, the utilities represent an interesting opportunity for IT providers.

Internet Becomes a Business Force

The Internet is transforming all of business, of which commerce is a subset, and it may be transforming the users. (But we'll let the psychologists tackle the effect of instant gratification being provided by the click-and-buy mentality.)

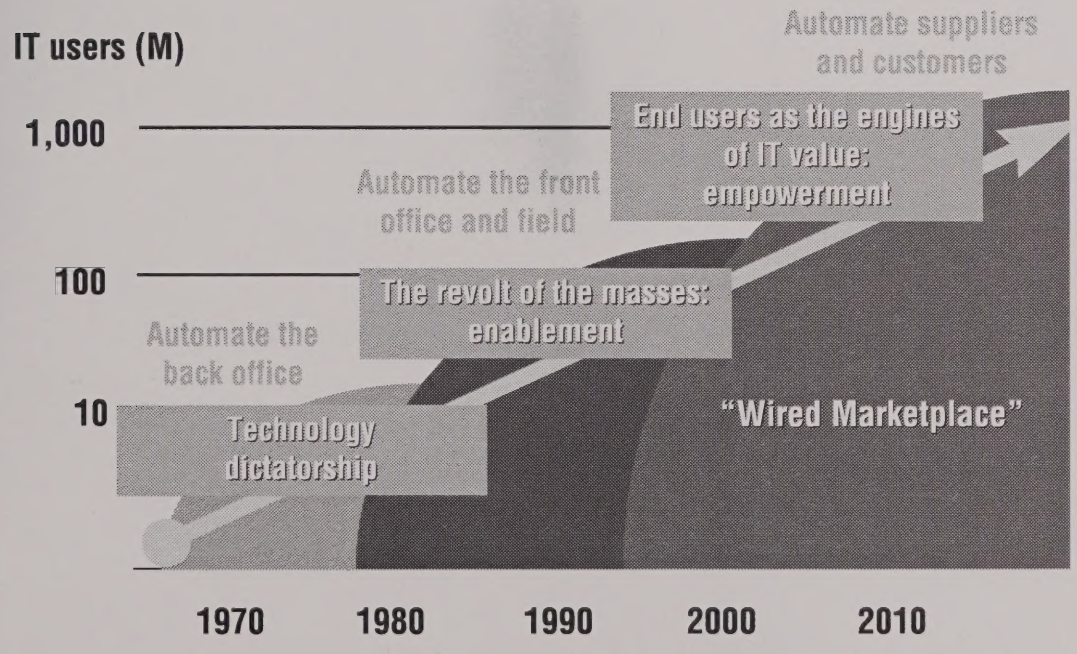
By 2003, the value of worldwide e-commerce commitments should exceed $1 trillion (yes, that's a *t*) according to IDC's Internet Commerce Market Model (ICCM) V5.0 (see Figure 5). That's a mind-bending, bone-numbing, start-the-engines compound annual growth rate of 92% — or nearly doubling every year.

FIGURE 1
U.S. CORPORATE INTERNET-RELATED INVESTMENTS, 1999 AND 2002



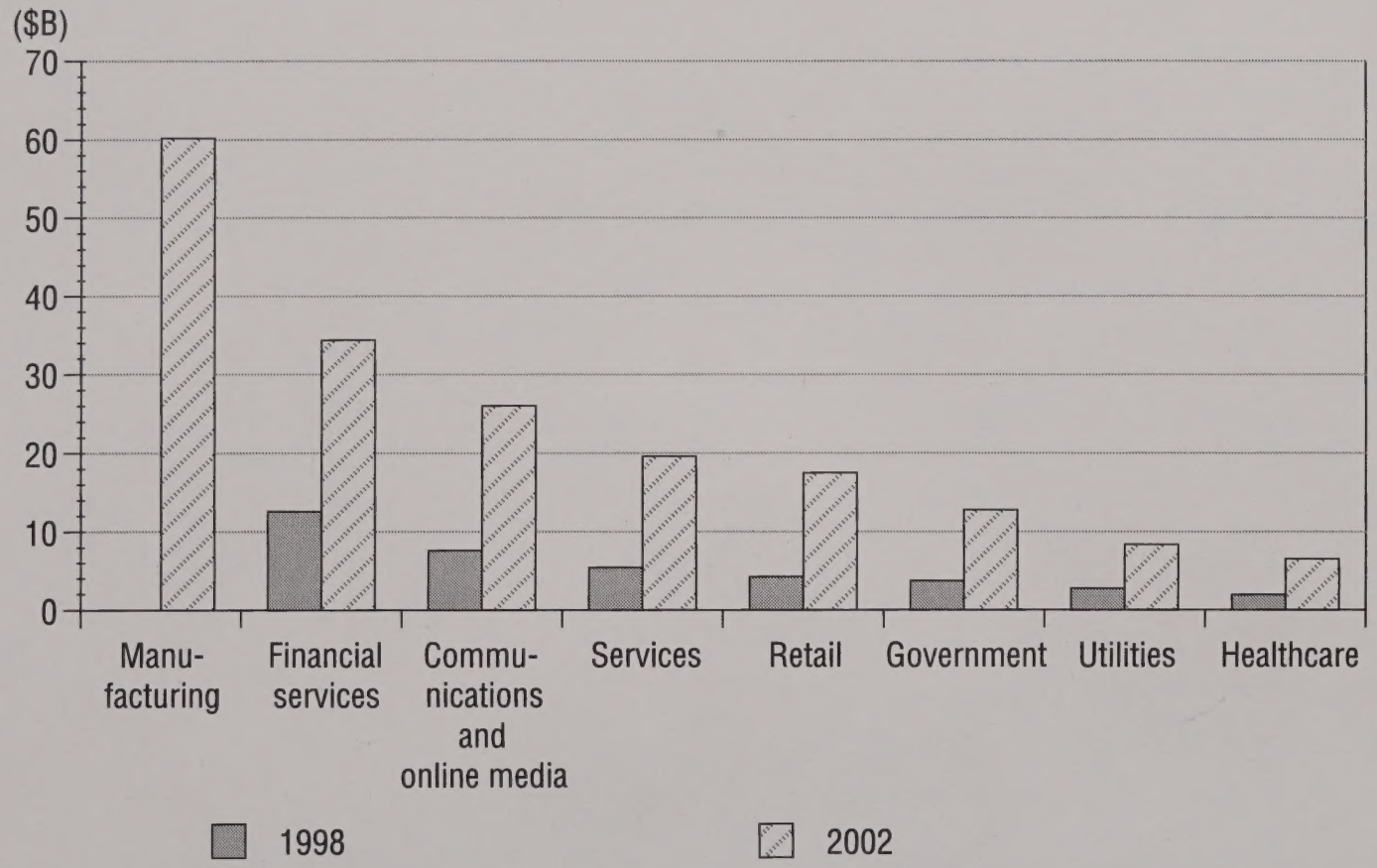
Source: IDC's *1998 Web Spending Model*

FIGURE 2
EMPOWERING END USERS, 1970–2010



Source: International Data Corporation, 1999

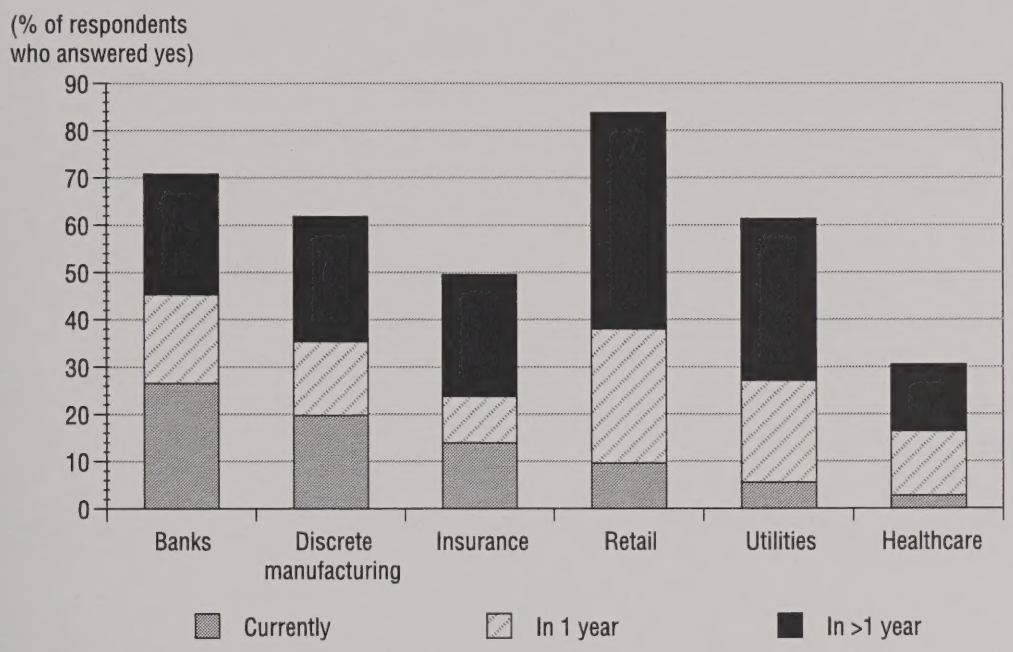
FIGURE 3
U.S. CORPORATE INTERNET-RELATED INVESTMENTS BY VERTICAL INDUSTRY, 1998 AND 2002



Source: *IDC's 1998 Web Spending Model*

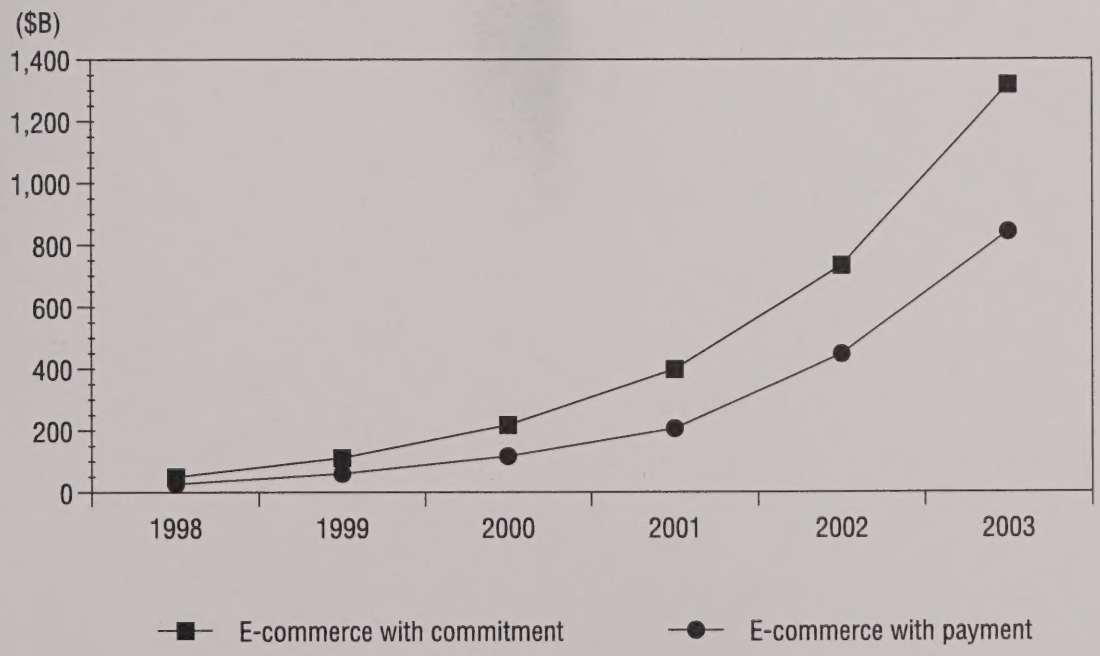
FIGURE 4
WHICH U.S. INDUSTRIES ARE THE BEST PROSPECTS?

Q: Are you selling/planning to sell on the Internet?



Source: IDC's *Technology Integration Panel Study, 1998*

FIGURE 5
WORLDWIDE E-COMMERCE SPENDING ON THE WEB, 1998–2003



Source: IDC's *Internet Commerce Market Model V5.0,* 1999

For the $1 trillion figure, IDC includes all transactions that simply involve a buyer making a commitment and creating the order on the Web. For purchases that include payment over the Web, the value is less, but still substantial: $843 billion in 2003.

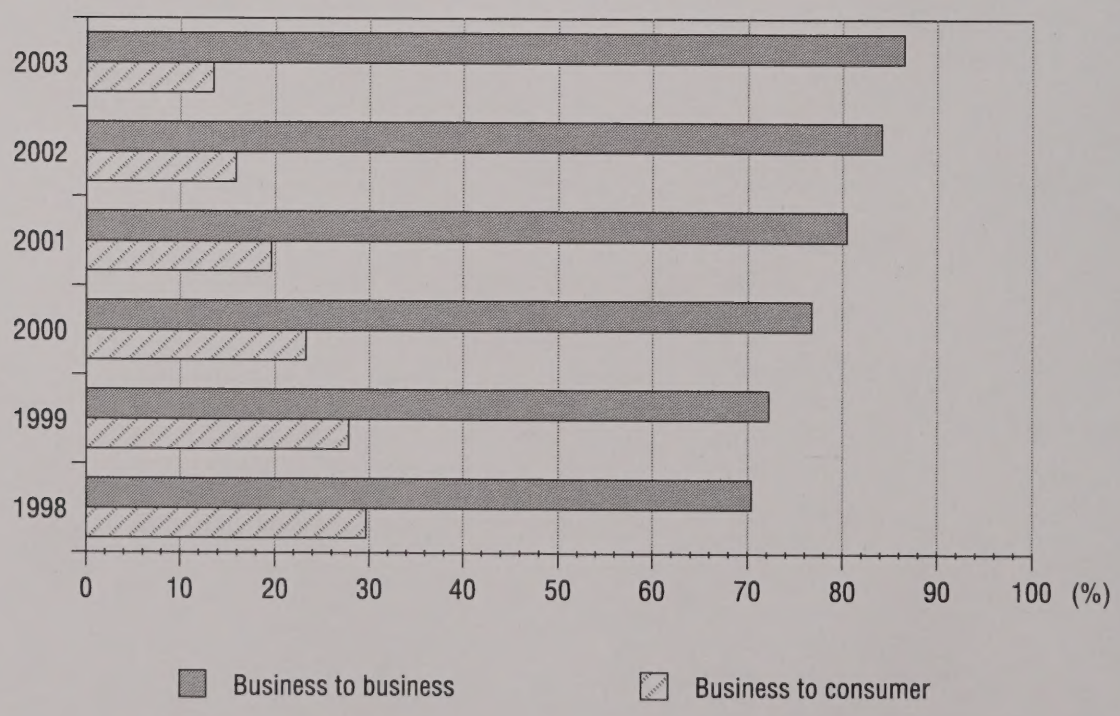
IDC estimates that 1997 was the first year in which more than half the value of all purchases made on the Web were paid via the Web. By 2003, 64% of the value of all transactions made over the Web will be paid via the Web, according to the ICCM. Although these figures may seem high at first blush, they make sense when one considers that in 2003, 87% of the value of e-commerce will be business to business, most of which will involve pre-existing arrangements for payments (see Figure 6).

E-commerce is defined as the enabling of commerce through electronic means.

The steps included in an ANSI (American National Standards Institute) working definition of the e-commerce process areas follows:

- **Planning.** Information gathering.
- **Identification.** Engagement.
- **Negotiation.**

FIGURE 6
COMPOSITION OF WORLDWIDE E-COMMERCE VALUE, 1998–2003



Source: IDC's *Internet Commerce Market Model V5.0,* 1999

- **Actualization.** Transaction.
- **Post-actualization.** Fulfillment and support.

Steps involved in the transaction stage are commit, create order, order entry, payment, settlement, security, and privacy.

E-Business Is Even Larger

E-business is an even larger phenomenon than e-commerce. It involves the electronic connection of business operations to suppliers and partners as well as to customers. As IBM has illustrated (see *The Gray Sheet,* Vol. 33. No. 19), the impact can be substantial in terms of saving costs, improving process efficiencies, and enabling corporations to become more proactive. If one thinks about the supply chain, one starts to get an idea of the magnitude.

The IT services area is expected to benefit from the booms in e-business and e-commerce. By 2003, the worldwide market for the combination of e-commerce and e-business services is expected to exceed $80 billion, compared with slightly less than $20 billion in 1998, according to IDC's Traci Gere, director of the Services Research group.

Users Multiplying

The number of people using the Web will increase at a CAGR of 28.7% between 1998 and 2003. In 1998, there were about 142.2 million users of the World Wide Web, but that number should more than triple by 2003, to 502.4 million users, according to IDC's Internet Commerce Market Model Version 5.0. This equates to two users per second coming online, according to Sean Kaldor, vice president of Developing Markets and Technologies. IDC attempts to eliminate double-counting of users that may access the Web both at home and within a company.

Note that additional users may access the Internet but bypass the Web.

Already, the majority (55.8%) of Web users are outside the United States, and the U.S. portion will continue to decline, according to Frank Gens, IDC's senior vice president of Internet and eCommerce research. No question, the Internet represents the best tool for capitalizing on global opportunities.

Device Story Yet to Unfold

As one can see from Figure 7, the ratio of devices to users is growing. This is no surprise, given the increased availability of PCs in the sub-$1,000, sub-$500, and now free categories. In Figure 7, IDC is counting only PCs and network computers.

Figure 7 does not include the plethora of devices that fall under the consumer information appliances category, which include "any number of a breed of new digital consumer electronics devices that are low cost, consumer focused, and easy to use and are designed to deliver some benefit of the Internet or an Internet-like service," according to IDC's Consumer Devices service. The current instantiations include NetTV, screenphone, Internet gaming devices, Internet smart handheld devices, consumer NC clients, and "other."

MAJOR TRENDS FOR THE MILLENNIUM

What are the major trends being set in motion by the juxtaposition of the emerging state of the IT market and the Internet? *The Gray Sheet* cannot resist listing what it sees as the top trends to watch in the next couple of years:

- **Community building.** Although the jury is still out, the sharper minds in the consumer Internet space are closely watching this possible evolution of two different groups: people who knew each other previously and those who find an affinity online. What the late stages of the industrial age wrought in terms of dispersed families, friends, and colleagues, the early stages of the information age are mending by facilitating communications. The communities that form online are of interest to commercial ventures because of their self-selecting interests/demographic factors.

- **Smarter appliances.** These devices will be everywhere, doing nearly everything — much of it unbeknownst to the consumer. Products range from the washing machine to the devices currently siting in the minds of folks such as you and this editor.

- **The connected dialtone.** The Gray Sheet has heard more than once from those in the business of providing cable services that in reality, the "always on" characteristic of cable could prove to be more important than the speed delivered. They may be right; this cable modem user views online very differently from those served by dial-up modems.

- **Transactional society.** This is the subject of a forthcoming issue. Think of three categories: pay to play, being paid to play, and tolltaker. Trends include the models of the application service provider (ASP) and the thin client with components in the sky.

- **The peaking of the current Wintel era.** Admittedly, the peaking will be prolonged, but The Gray Sheet doesn't yet rule out this dynamic duo in the next era of appliances and other smart devices along with the potential trend toward thin client. Intel has the StrongArm CPU design, and Microsoft could buy a couple of people who know how to create compact code.

- **Personalized services.** Are avatars finally coming? Providing utility without being invasive will be a challenge.

- **Delivery in bits.** E-commerce could reach the next level by delivering in bits items previously delivered as atoms. For example, look at the music industry and the concomitant examination of ways to protect copyrights and royalty issues. Books could be next.

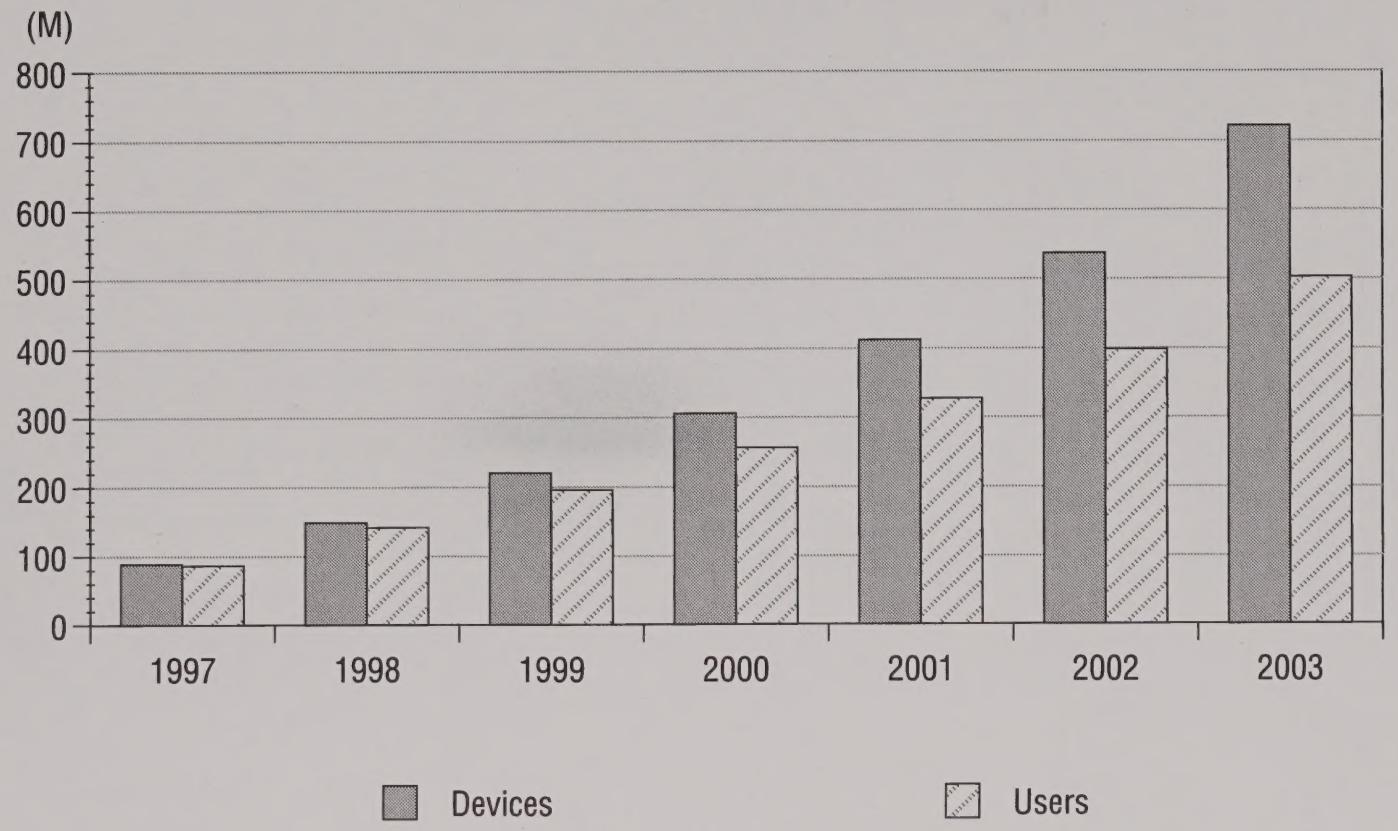
- **Applications integration.** E-business will drive applications integrations solutions because of its scale and heterogeneous nature. Ultimately, IT will serve business processes.

Two of the most important technologies emerging with wide impact on several of the above topics are XML and directories. Both have the potential to assist in applications integration

While we're in the process of making lists for the forthcoming year, add the following megatrends from John Gantz, IDC's senior vice president of personal systems, peripherals, collaborative computing, and services:

- Ubiquity — Jini?
- Mobility
- Complexity — directories for jillions of passwords and network objects
- Infinity — data available for access
- Interactivity — the connected dialtone

FIGURE 7
PC AND NC USERS AND DEVICES ON THE WEB, 1997–2003



Source: IDC's *Internet Commerce Market Model V5.0*, 1999

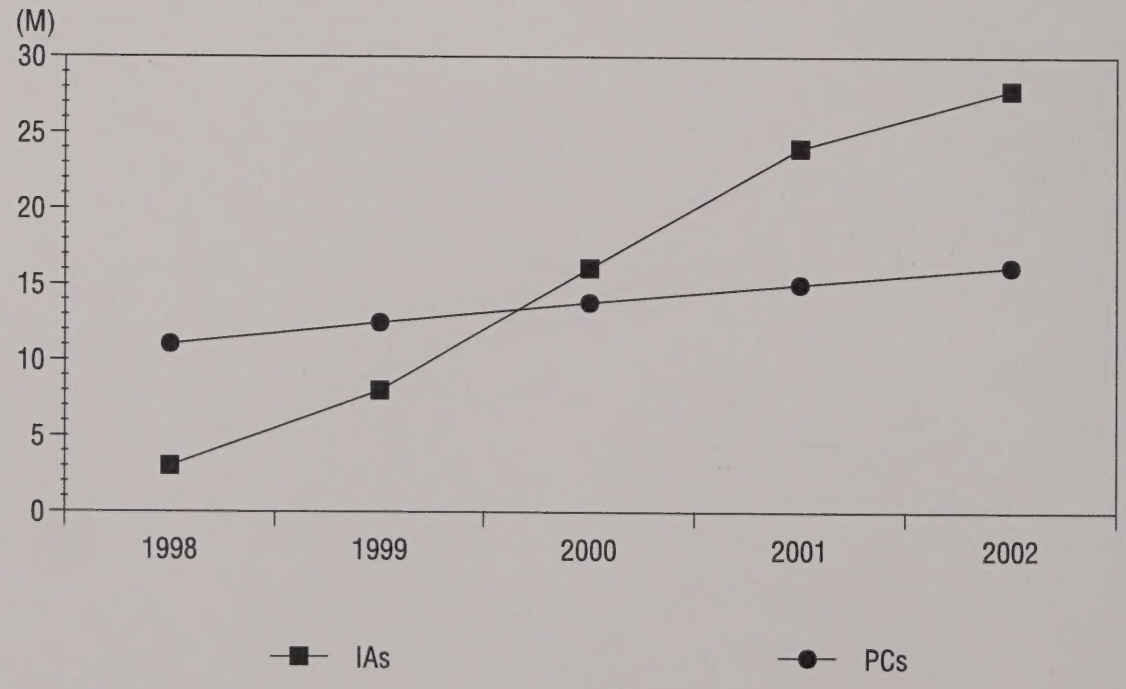
By 2001 in the United States, shipments of information appliances will outnumber those for consumer PCs, according to *PCs Versus Information Appliances: Who Will Win the Battle for the Consumer?* (IDC #17947, January 1999). (See Figure 8.)

Beyond the defined category of information appliance comes the great unwashed horde of devices that will be embedded in washing machines and other home appliances and provide a level of communication and, potentially, intelligence about remote diagnosis. The image used at the IDC Directions '99 conference was of a cockroach sporting an embedded device. Yes, these embedded critters will be everywhere — and using them should be fun.

Wired Homes

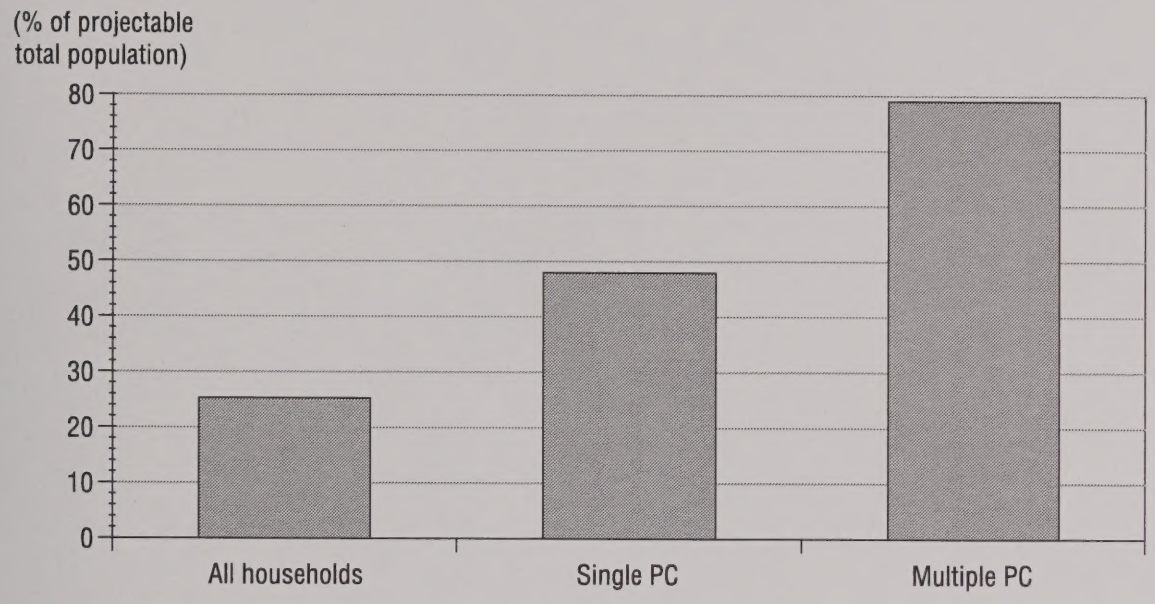
The much-vaunted wired home is coming, albeit initially in a rudimentary form. Penetration of the Internet into consumer lives has reached record proportions. IDC conducted a survey in June 1998 that found more than one-quarter of all homes were online and more than half of PC owners were online (see *1998 Consumer Computing Survey*, IDC #17173, October 1998). As one might expect, homes with multiple PCs were even more likely to be online (79%) than those with one PC (48%). (See Figure 9.)

Figure 8
U.S. Information Appliance and Consumer PC Shipments, 1998–2002



Source: International Data Corporation, 1999

FIGURE 9
U.S. HOUSEHOLDS ONLINE, 1998



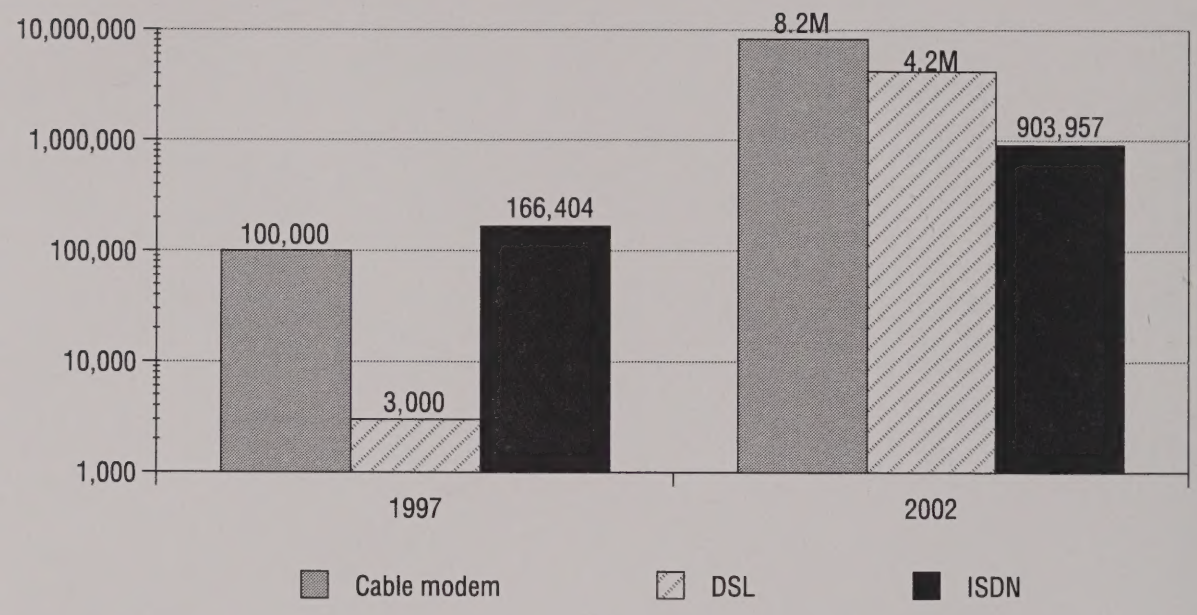
LINE SPEED: THE RACE

Speaking of cable, a larger proportion of U.S. TV households have cable than those that do not. Although providing two-way service requires some infrastructure work, the potential exists for the cable companies to blindside the slow-moving telcos. Indeed, *I'm Tired of Waiting! Residential High-Speed Data Services Market Assessment,* 1997–2002 (IDC #17018, September 1998) forecasts just that (see Figure 10). Regrettably, MediaOne (and probably other cable ISPs) have yet to address the quality-of-service issue caused by heavy use when all the yuppies' children are home from school.

At the enterprise level, bandwidth is also peddling fast to keep up with heightened demands, including those involving Internet access. According to Gigi Wang, senior vice president of IDC's Networking and Telecommunications program, the trend is in synch with others such as growth in CPU speed and disk capacity (see Figure 11).

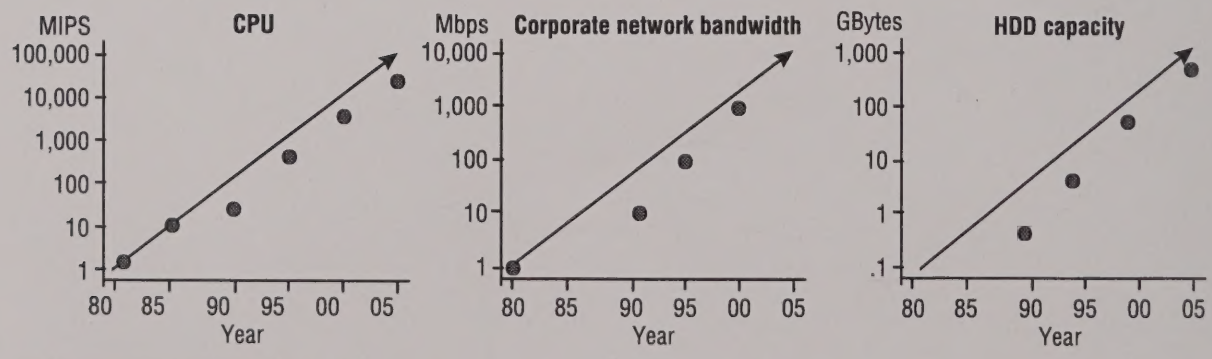
Can the conclusion be anything but that Internet spells opportunity?

FIGURE 10
U.S. HOMES SERVED BY ACCESS METHODS, 1997 AND 2002



Note: Logarithmic Scale
Source: International Data Corporation, 1999

FIGURE 11
THE ENTERPRISE TECHNOLOGY RACE, PERFORMANCE



Source: International Data Corporation, 1999

INTERNET INSIDER

Occasionally, *The Gray Sheet* presents an array of topical thoughts ruminating in the minds of IDC analysts. The following sections include such an array.

LATEST IDC WEB MINDSHARE MONITOR: OPPORTUNITY IS SHIFTING

In the last 12 months, IT executives have shifted their views of which companies are the top IT suppliers in the Internet/e-commerce space.

When asked, "Which IT supplier is most strategic to your company's use of the Web?" those who named Microsoft dropped to 12% from 24% a year earlier. IBM mindshare also dropped, from 10% to 7%. Rising in perception as key Internet suppliers are Netscape, Oracle, Cisco, AT&T, Hewlett-Packard, and Compaq. The percentage who answered "none" or "don't know" dropped from 46% to 43%.

The key messages are these:

- A lot of Internet mindshare is still unclaimed by any vendor.
- Mindshare that was claimed last year has proven very hard to hold.
- More IT vendors are staking a legitimate claim in this important market space.

— Frank Gens

DOES YOUR TRAIN OF THOUGHT HAVE A CABOOSE?

Online auctions are the new e-commerce accelerators. Companies like eBay and Onsale represent just the tip of the iceberg. In 1999, we'll see auctions trickle down to nearly every industry segment, from home-buying to sporting goods to mortgages. In the business-to-business space, Internet-based trading networks will quickly emerge between suppliers and manufacturers. Why? The efficiencies of the Internet match up directly with what have traditionally been the inefficiencies of auctions in the offline world. Geographical barriers are knocked down, information can flow in real time between buyers and sellers, and the cost of participating in an auction is no longer prohibitive to the mass market. Any company setting up shop online needs to be aware of this new market mechanism, and e-commerce software vendors selling solutions to merchants must add auction functionality to their current product mix.

— Jill Frankle

Business-to-Business E-Commerce Has a Ripple Effect

Business-to-business Web-enabled e-commerce is having a ripple effect. It has eased the process of procurement for industry; eased it so much, in fact, that some companies are finding that they will no longer need certain distributors, and companies can go directly to their suppliers. Consequently, savvy distributors are also using Web-enabled e-commerce to their advantage by aggregating materials from multiple distributors and creating electronic trading networks.

Like-minded distributors can pool their products for display on a single Web site, gaining in market power and eliminating redundant costs (e.g., in Web site development). The most successful sites will target a niche such as electronic components **(www.netbuy.com)** or machine tools **(www.milpro.com).**

Communities will then easily develop as these Web sites add support features such as technical assistance or help systems for the common product set. Unsuccessful sites will offer a wide range of products (www.orderzone.com), which will weaken identity, make it too difficult for a user to locate a specific product, and just too difficult to develop a successful community.

— Joan-Carol Brigham

Entering the Era of Personal Ubiquity

Everyone is talking about moving applications to the Web. Before the millennium, however, the real action will be synchronization and integration with the desktop, not its replacement. There are half a dozen Web calendar services and countless e-mail services. Users will select them based on their ability to synchronize with their personal information management (PIM) and their personal digital assistant (PDA) devices, not on their ability to replace these indispensable tools. The leader is Yahoo!, which can now synchronize Yahoo! Mail and Calendar with the desktop and with a user's PDA. This battle area will be key for portals struggling for indispensability in a world where they've become a commodity.

This is no mere Copernican revolution. The future is not desktop centric, nor is it Web centric. There will be no central repository for our information. We will keep it in multiple locations, each one of them keeping current with the others. It will be a lot harder to pick winners and losers because ownership of the desktop, the gadget, the application, the portal, or the browser will mean less control over the user. Users will have as many views of their personal information as they desire from as many locations as they can manage.

— Barry Parr

Is Business-to-Business Commerce Ready to Go Inside-Out?

Success for major business-to-business e-commerce sites like Dell and Cisco has been based on a supplier-centric model, with customers required to come to the supplier's Web site to conduct business. IDC believes this success will be challenged by the growing number of customers who want to turn this model inside-out — those who want the suppliers' information to come to them, in the context of the customer's own online procurement system.

This shift to buy-side systems will require business-to-business sites to add support that allows product, pricing, and other data to be drawn into customers' procurement systems. From a technology standpoint, this requires aggressive support for emerging procurement standards (OBI, XML, et al.). From a business model standpoint, the challenge may be greater: As the buying context shifts from a seller-controlled environment to a buyer-controlled one, suppliers will have to find new techniques for maintaining and strengthening customer relationship and loyalty.

— Frank Gens

Sticky Communities Are Key to Commerce

E-commerce merchants should not be so quick to dismiss the impact that a strong community can have on their Web sites. A community that is extremely focused, structured around a topic, and well designed (but not monitored) can generate "stickiness" for the site and draw users back time and again. For example, Motley Fool **(www.fool.com)** allows members to create fantasy sports teams, which then compete against teams created by other participants. These community strategies draw users in and keep them coming back for more interaction; when they are properly executed, communities can be as effective as free messaging and one-click ordering.

— Juliana Nelson

Total Web Solutions Will Alleviate E-Commerce Growing Pains

The biggest challenge faced by e-commerce leaders such as E*Trade, eBay, and AmeriTrade is not figuring how to lure customers into their Web sites but how to manage the surging demand for their services, which has resulted in several site crashes. As more customers shop and trade online and new entrants compete in the e-commerce market, poor performance and disruption in services will become less tolerable.

One way for IT vendors to help sites cope with these e-commerce growing pains is through the creation of a total Web solution. It must draw on the expertise of hardware, software, network, management, and professional services vendors in a way that captures their

competencies to formulate a strategy that addresses business and technology issues in an integrative manner. Vendors that act proactively and provide a total Web solution, through partnerships or by themselves, will emerge as the e-commerce vendors of choice.

— Anna Giraldo

Twilight of the Portals?

Portals are even more of a commodity than when IDC released *Web Usage Trends, 1998: The Power of Portals: Who's Using Them and How* (IDC #18352, December 1998). MSN will use AltaVista for search, AltaVista will use HotMail for e-mail, and both will be using Looksmart's directory services. How do we tell them apart? This is more than commoditization. It is the total hollowing-out of portals, not unlike what happened to the American television set industry in the 1970s. Microsoft may have overcorrected, going from building big-ticket content to draw audiences to using HotMail and Explorer to assemble big audiences for generic content. This looks like another evolutionary dead end. AOL, Yahoo!, and Excite all understand that leadership, integration, and exclusive content matter.

But have the barriers to entry dropped even lower? Anyone can buy the portal building blocks in the open market. The functions that portals provide can be distributed on the Net. Midsize portals now hear the footsteps of 100,000 small competitors. IDC's recommended branding and switching cost strategies are more urgent than ever.

— Barry Parr

IBM's Master Plan

To prepare for the coming world of next-generation Internet, IBM has a master plan: recreate the data center service bureau! To support a world where applications reside in hosted network environments and can deal with massive quantities of objects and highly scalable, high-speed networks, IBM is creating a mega data center. The center will use ISPs as the channel to deliver application services to businesses. The beauty of this return to the past is that it supports a low-cost outsourcing model for Internet commerce executives, a low-complexity services model for ISPs, and of course a high-demand, high-availability environment suited to IBM and other strong system suppliers' expertise. In addition, software companies have an opportunity to become the "standard" application, tools, or infrastructure in this service delivery.

— Michael Sullivan-Trainor

THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No. 20 IDC #18581 March 10,1999 Molly Upton, Editor

Businessware: The Next Evolution?

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IDC

The need to integrate and automate business processes across the boundaries imposed by traditional stovepipe applications is becoming more critical as various aspects of business become more tightly interwoven. Businessware is IDC's term for the software that can provide the missing bond needed to unite decisions about how the business is run across downstream implementations of the information systems.

In the future, businessware could become the catalyst and run-time infrastructure used by customers to unite their heterogeneous worlds in order to deliver application integration, event-driven processing, and business process automation (BPA). Businessware is suited to serve as the foundation upon which e-business, front-to-back office, straight-through processing, and customer care applications scenarios are built.

An important distinction is that businessware products will be designed for use by business people and not for use by applications developers or programmers, according to Ed Acly, director of middleware research and author of *Businessware: Uniting the Business to Deliver Greater Customer Value* (IDC #18081, December 1998).

Businessware has the potential to empower not only those within the business but also the stakeholders outside the corporation, such as customers, trading partners, and suppliers. Businessware may be the piece needed to add the extra layer of corporate utility to the Internet.

Certainly, the premise of software designed for use by business people isn't new, but now it appears as if the right combination of enabling technology ingredients may indeed make this premise a reality. After all, we're nearly in the 21st century, and such a change may help IT get to the next step in pervasiveness.

Businessware is designed to serve the needs primarily of the business rather than the needs of technical folks who build the applications that businessware integrates. *The Gray Sheet* thinks of businessware as a superset of message-oriented middleware — or middleware on steroids. Like middleware, businessware provides glue. But the job of businessware's glue is to oversee, integrate, and unite applications across the business. Businessware's capabilities facilitate applications integration, event-driven processing, and business process automation.

THE GRAY SHEET

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Businessware includes any or all of the following three approaches to deliver greater customer value:

- **Application integration.** The bottom-up approach to eliminate the islands of automation
- **Event-driven processing.** The middle-out approach to energize business operations
- **Business process automation.** The top-down approach to automating the business, including both production workflow and business modeling

With these implementation choices (see Figure 1), customers can buy into businessware from the bottom up, middle out, or top down based on their business needs, cultural outlook, and willingness to commit. Other key components of businessware include asynchronous processing and publish and subscribe (P&S).

Businessware strives to take the programming out of application integration and deliver independence from the following:

- Network and OS — by message-oriented middleware
- Message format — by application integration
- Application program interface independence — by application integration
- Message destination — by event-driven processing
- Business activity independence — by event-driven processing
- Business process independence — by business process automation

By examining the growth of related technologies, one can see some of the pent-up demand awaiting the emergence of businessware (see Figure 2).

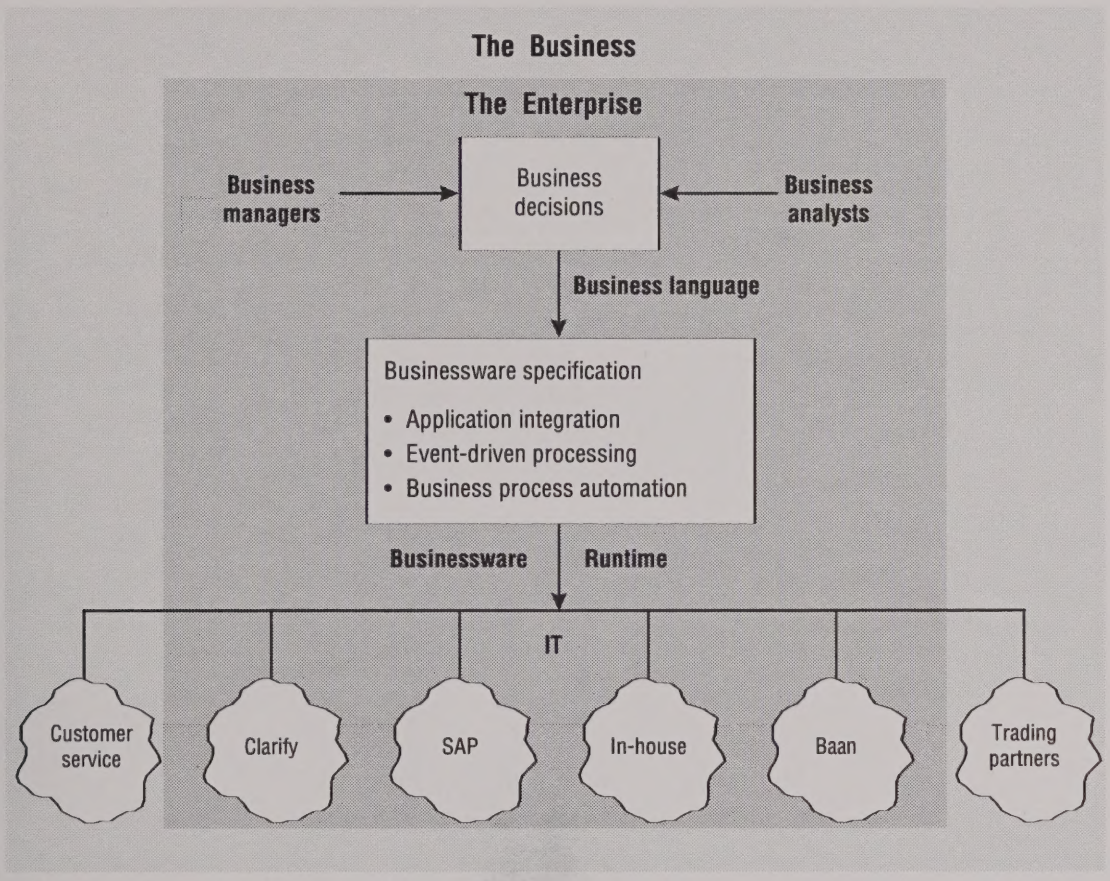
Drivers for Application Integration

The rise in packaged applications software, and especially ERP packages, contributes to the need for applications integration, despite the growing use of application programming interfaces (APIs) in these packages. On a corporate level, business realities such as mergers, deregulation, and evolving distributed organizational structures all add to the need to integrate applications.

The Internet also increases the need for application-integration as follows:

- E-commerce heightens the need to have distinct applications seamlessly interoperate.
- As companies encounter new competition via the Internet, they need to be able to rapidly adjust business processes.

FIGURE 1
BUSINESSWARE EMPOWERS THE BUSINESS



Source: International Data Corporation, 1999

Opportunities include a more competitive company, thanks to the ability to eliminate time between steps performed in a business process such as supply-chain management, customer care, and front-to-back office applications.

What traits are needed in an application integration system? Adjectives that come to mind include agnostic, dependable, scalable, and flexible. Such a system should be able to operate across a business, regardless of platforms or application development technologies, and it should facilitate stovepipe applications to interoperate but not interfere with them.

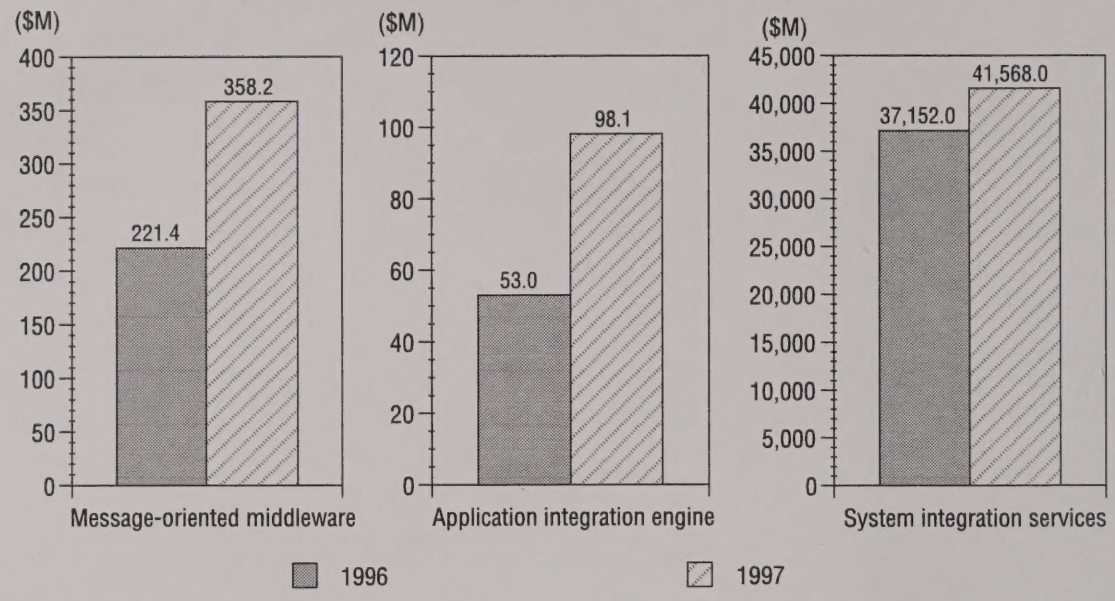
EVENT-DRIVEN PROCESSING

If one adds publish and subscribe capabilities to message-oriented middleware, P&S enables the concepts of business events and business activities as constructs that can be understood by the business community. Thus, one business activity notifies one (or more) business activity, which knows that it should take further action.

When knowledge about relationships and dependencies is put between business activities in businessware rather than hard-coded in the application program, the programs can be more easily integrated with each other. Just as important, the business knowledge captured in businessware can be changed to fit the need of new business conditions without changing the program code.

Event-driven processing is designed to improve interactions within business operations. Opportunities exist to do the following:

FIGURE 2
WORLDWIDE APPLICATION INTEGRATION SPENDING, 1996 AND 1997



Messages in the Data:

- The increase in spending between 1996 and 1997 was 61.7% for message-oriented middleware and 85% for application integration.
- In 1997, 65% of systems integration projects used packaged applications, and a significant portion of costs were for customized application integration.

Source: International Data Corporation, 1999

- Integrate manual business activities such as transactions between business partners
- Streamline cycle times, which translates to competitive advantage
- Improve decision support within a corporation and its stakeholders through real-time delivery of data
- Improve dissemination and reuse of application program processing results (in the form of business events) by hosting business logic for distributing events in the businessware
- Improve relational database performance by replacing data-centric application designs with event-driven designs

BUSINESS PROCESS AUTOMATION

Business process automation carries the greatest potential to deliver customer value, but it also calls for the largest customer commitment. Companies may choose to start their efforts with either application integration or event-driven processing. Although support for BPA is just beginning to emerge in several businessware products, IDC expects BPA support to rapidly increase over the next year or two.

Likely new ingredients in businessware targeted at delivering BPA are expected to include process models, a richer set of business rules, policy enforcement, real-time business adaptation, more robust graphical specification tools, repository storage of business process models and business rules, and process management.

With the combination of business rules and the real-time adaptation to current business conditions, customers should be able to finely tune and tailor the automation of their business process. By having the rules execute in the businessware runtime, the company gets more bang for the buck because it can dynamically reconfigure the activities that are fulfilled by information systems.

Among the potential benefits of BPA are the following:

- Lower costs and improved efficiency as a result of a focus on the business in an integrated fashion
- Changing methods of conducting business
- Competitive advantage from the ability to rapidly change the automation of business processes
- Tighter integration with business partners
- Construction of new business processes

THE NEXT STEP

The next step after discrete businessware implementations would be for businessware to interoperate on both product and management levels. Some businessware players include Active Software with its Integration System; Candle Corporation's Roma family; New Era of Networks (Neon) with its MQIntegrator and Neon Integration Libraries, Business EventManager, and Enterprise ProcessExecutive; Software Technologies Corporation (STC) with its DataGate Product Suite; and TIBCO and its Enterprise Application Integration Suite, TIB/ActiveEnterprise.

Active Software's Integration System has a business event-based model and comprises product categories such as information brokers, adapters, agents, integration and management tools.

Candle's Roma family is designed to facilitate creation and management of network applications that can be integrated to support business processes. Roma's component-based architecture is designed to allow use of legacy code without rewriting.

Neon's advanced rules and formatter engine has been incorporated as part of IBM's Business Integration portfolio in its MQ Series Integrator. Previously, these features were jointly marketed by IBM and Neon.

Software Technologies' DataGate provides enterprise application integration, and STC has a number of strategic software partners. It is making a name in the health care systems arena.

TIBCO's TIB/ActiveEnterprise draws upon the firm's expertise in automating Wall Street trading floors and pioneering publish and subscribe technology.

Is IT Impervious to the Asian Flu?

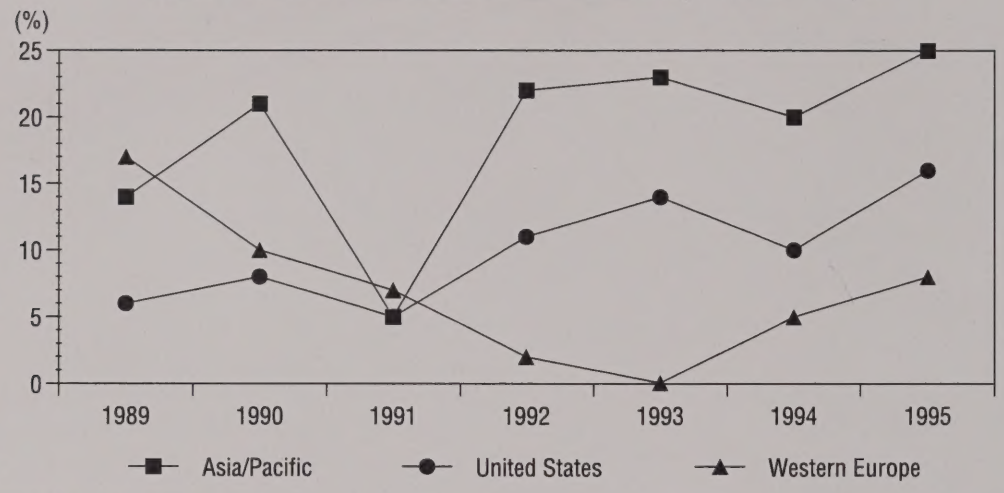
In the last recession in the early 1990s, the worldwide IT market slowed but continued to increase throughout the recession, thanks to its ability to improve efficiency and productivity. Countries maintained spending on IT as a percentage of their gross domestic product (GDP).

Now, with Asia facing its own economic flu, the looming question is how that region will impact worldwide IT spending growth. This issue is examined in depth in *The Asian Flu: Will Worldwide IT Markets Catch It? Or Have They Built Up an Immunity?* (IDC #18197, January 1999).

If past is prologue, in the previous recession, the Asia/Pacific IT spending rate dipped in only one year, 1991 (see Figure 3). In the following years, the region's IT spending once again grew rapidly as it gained confidence from the U.S. rebound. These years of growth no doubt helped the Asian markets to catch their Western European and North American counterparts in terms of technology adoption.

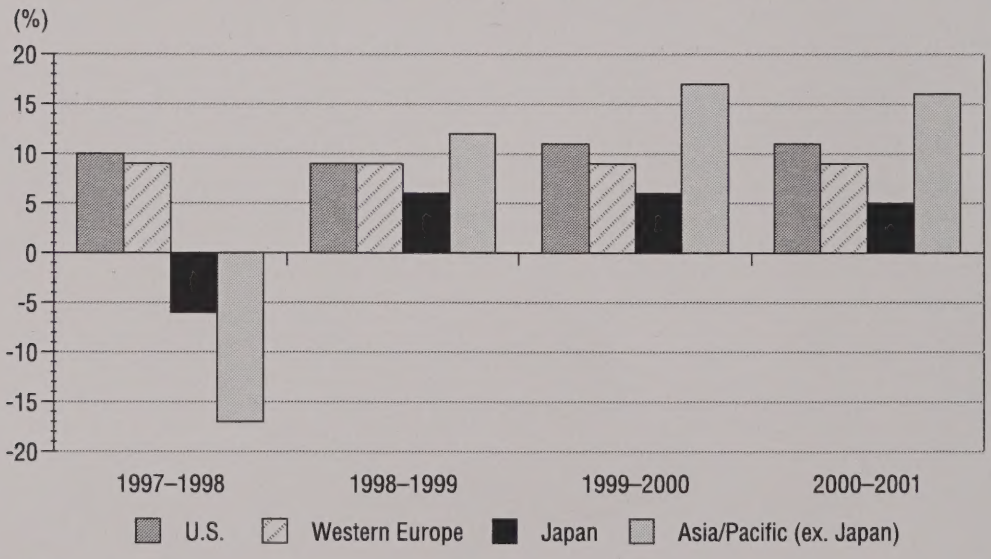
Indeed, IT demand should recover in Asia/Pacific by 1999 if the economies in the U.S. and Western Europe continue to grow, according to Philippe de Marcillac, IDC's senior VP, Worldwide Research (see Figure 4). However, given the major industry trends in place now, such as lower-cost devices and more demand from consumers and small businesses, *The Gray Sheet* posits that the rate of IT spending in Asia/Pacific could be less than that of the past.

FIGURE 3
GROWTH IN IT SPENDING BY REGION, 1989–1995



Source: International Data Corporation, 1999

FIGURE 4
ASIA/PACIFIC IT REVENUE GROWTH BY REGION, 1997–2001



Key Assumption:

- Economies in the U.S. and Western Europe continue to grow.

Source: International Data Corporation, 1999

CURRENT TECHNOLOGY TRENDS

The technology trends in the late 1990s include the following:

- Internet technology adoption
- Implementation of low-cost IT solutions
- The growing importance of IT to small business

- Growth in the services market
- Emergence of a strong consumer market

The current crisis in Asia/Pacific is likely to accelerate several of these trends and present new opportunities vis-à-vis the others. IDC believes there are several key opportunities in Asia/Pacific. If the crisis were to spread to other regions, it is likely that these same opportunities would present themselves. Latin America has felt the effects of the Asian crisis, and its IT markets have begun to reflect the adverse economic climate.

The factors that may reduce IT spending as a percentage of GDP by nations feeling the Asian flu are the pervasiveness of low-cost solutions and the potential for the consumer and small business markets to be more cautious in investing in IT infrastructure than would be the large corporations, which were the major spending sources in the last recession.

However, IDC notes the reliance of both the consumer and small business sectors on technology should cushion this blow. Cellular phones, smart handheld devices, and Internet access have been integrated into everyday life. As this trend continues, a softening economy will have a smaller and smaller impact upon demand.

The trend toward low-cost devices will be accelerated in Asia/Pacific in the coming year, and use of Internet technologies will continue to be a market driver. The number of users in Asia/Pacific will increase more than threefold by 2002. The bleak economic picture is not deterring investments in Internet technologies because connecting to the Internet is seen as an essential part of recovery. Thus, the crisis will likely accelerate the adoption of both Internet and intranet technologies.

The use of professional services firms to implement IT strategies will continue. Growth in this market will be driven by the desire to implement Internet and intranet strategies. Moreover, firms can take advantage of the presence of local service providers that are paid in local currencies.

Past Experience

In the recession of the late 1980s and early 1990s, the growth rate of worldwide IT spending dropped to single digits for three consecutive years, coinciding with the three most difficult years of the recession. (see Figure 5).

During the economic recession, the various affected nations continued to invest in IT, maintaining the level of spending as a percent of GDP (see Table 1). Because IT is seen as a necessity, the market was not affected by the recession more than the economy itself. In fact, it may have been protected from the effects of a recession to some extent because of its importance.

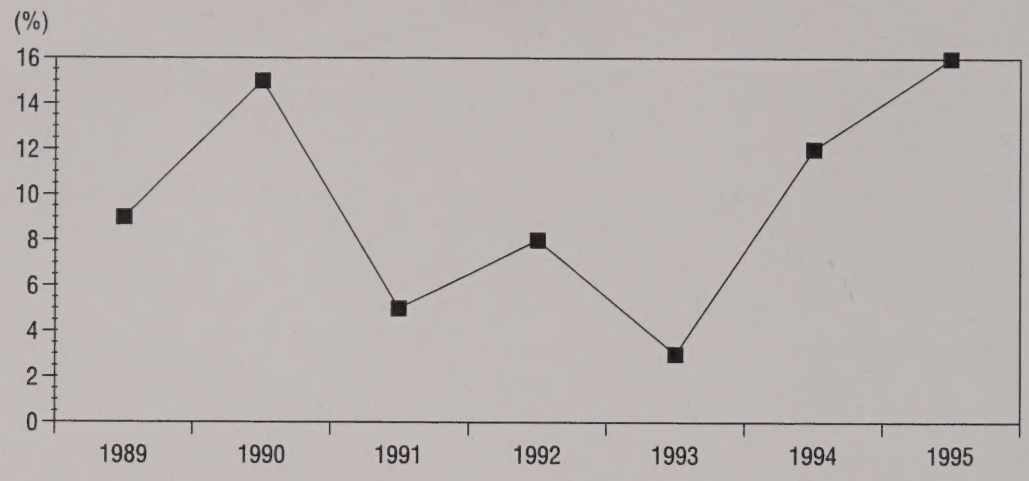
Table 1
IT Spending by Country, 1986–1992 (%)

	1986	1987	1988	1989	1990	1991	1992
United States	0.002	0.002	0.002	0.003	0.003	0.003	0.003
United Kingdom	0.024	0.027	0.030	0.032	0.030	0.028	0.027
Sweden	0.020	0.021	0.022	0.024	0.023	0.023	0.023
China	0.001	0.230	0.230	0.230	0.350	0.390	0.720
Japan	1.200	1.500	1.600	1.700	2.100	2.100	1.900
Korea	1.400	1.300	1.300	1.300	1.400	1.300	1.600

Source: International Data Corporation, 1999

Although various countries were affected at different times, the global marketplace did not begin to see IT spending climb to pre-recession levels until 1994 when the European economies once again began to grow (refer back to Figure 3).

FIGURE 5
WORLDWIDE FLUCTUATIONS IN IT SPENDING GROWTH, 1989–1995



Source: International Data Corporation, 1999

Western Europe was primarily responsible for the significant slowdown in worldwide IT market growth in 1993. Asia/Pacific helped to bring the average growth in IT spending up in 1992 because it did not yet feel the effects of the economic recessions in the United States and Western Europe. Although growth slowed in Asia/Pacific to 5% in 1991, by 1992, the IT market had regained its momentum, growing 22% in Asia/Pacific. The U.S. IT market also began to improve in 1992, growing 11%.

Internet Anywhere: Jini and Friends

Sun has let the first vapors of Jini out of its bottle and attracted support from several industry players. Some key complementary technologies that might allow Jini to fulfill its much-heralded capabilities include Novell's NDS and HP's JetSend.

Jini is device-independent Java code that enables devices to locate the desired target device. Jini devices will be able to register themselves on the a network's Look Up Service, which is Sun's version of a dynamically configuring directory.

Novell's NDS could provide some handy management and security features for Jini's access capabilities. HP's JetSend's device-independent imaging capability would complement Jini, whose strength appears to lie in the registration process.

Thirty-five other companies also were on the launch bandwagon, including 3Com, Xerox, Canon, AOL, Cisco, and Novell. Microsoft, in an effort to take some of the wind out of Sun's sails, announced its Universal Plug and Play initiative.

Regardless of how we get there, the need for device-independent code will be propelled by the growth in intelligent appliances.

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No. 19 IDC #18501 | February 19, 1999 | Molly Upton, Editor

IBM e-business: Creating Business Value

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IDC

IBM is starting to reap the rewards of its e-business strategy, which it defines as providing business value to the corporation and its stakeholders. e-business, IBM notes, is much broader than e-commerce because it serves a broader constituency and a variety of Web-based processes and transactions.

To start, IBM cast a keen eye on various processes that had potential for improvement and identified audiences that could be served with the aid of the Internet. It created a business case around applications opportunities in each area:

- Customers
- Partners — about 45,000 developers and resellers
- Suppliers
- Employees — 283,000
- Influencers such as consultants, press, and analysts

Cost-justifying the effort wasn't much of a problem because the group investigating was able to project returns on investment of up to 1,200% in some areas. An obvious opportunity was procurement, which held the highest ROI and was the easiest to implement, observed Dick Anderson, general manager of Enterprise Web Management (EWM), IBM's internal e-business effort.

Throughout the planning process, IBM recognized the corporate Web presence was an extension of the brand.

Governance is a key issue that involves finding the right balance between centralized and decentralized participation in the Web effort. Other lessons learned and ongoing issues at IBM include the following:

- How do you lead change and consistency in Web strategy among several business units and customer set organizations?
- How will the Web change the way business units do business?
- To what degree should a business site be sticky and/or personalized?
- Should prices be local or globalized?

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In addition, marketing's demands for information about Web site use are insatiable.

Anderson said the following questions resonate with many executives at the level of a CIO and above:

- Who owns the Internet?
- Where's the business value?
- Should governance be centralized or decentralized?

PROCUREMENT

Procurement represented an obvious source of low-hanging fruit with good return on investment. Essentially, IBM's plan resembled that of others: leave the EDI systems alone and focus on the non-EDI transactions. The IBM focus is on using the Internet to lower costs in the supply chain itself.

Among the efforts are the following:

- **Streamline the non-EDI order process.** IBM supplies Web-based forms to its suppliers and later converts the information for use by its EDI system.
- **Create a central in-house requisition catalog on the Web.** Doing this has, in part, helped reduce the procurement cost from 2.9% of the item to 0.9% of the item and reined in maverick buying from 30% to 2%. As a byproduct benefit, Global Services is now offering this capability to other firms.
- **Compare prices of subcontractors and IBM.** IBM procures goods at the lower price, leveraging the best buying power.

Starting from zero at the beginning of 1998, IBM by yearend did $1.8 billion in online procurement over the Internet, without touching the EDI volume.

During 1999, IBM expects to buy $12 billion worth of goods and services over the Internet, saving $240 million and eliminating all paper invoices.

E-COMMERCE VOLUME

IBM also has high expectations in the e-commerce realm and clearly intends to leverage the Web for direct sales as well as for sales to its business partners in 1999. (*The Gray Sheet* was not the first frustrated would-be buyer of a ThinkPad to visit the site.)

During 1998, IBM went from doing $38 million in business on the Web in January to doing $1.2 billion in the month of December. The majority of these revenues are being generated by business-to-business extranets with IBM's Business Partners, OEMs, and enterprise customers.

In 1999, IBM expects to sell $10–15 billion worth of products via e-commerce, of which more than $4 billion is expected to come from Business Partners. The balance will include sales to enterprise customers, which are sometimes fulfilled through partners; component sales to OEMs; and ShopIBM sales via ibm.com.

IBM is rolling out configurators in ShopIBM to make the site more competitive. Currently, the company offers configurators for consumer PCs and ThinkPads as well as midrange AS/400 and RS/6000 products. It will have configurators for its business PC products later this year.

Separately, IBM already offers configurators in its PartnerCommerce applications with Business Partners for PC products and servers.

CUSTOMERS

The Enterprise Web Management team focused on making IBM a more responsive business that is efficient for the customer. IBM cites 14 million self-service user session transactions on the Internet in 1998, estimating these avoided $300 million in support costs. Most of these sessions were from PC users. Anderson estimates transactions and cost avoidance will double in 1999.

IBM is also investigating the degree of personalization it should offer.

EMPLOYEES

Distance learning is expected to grow rapidly through use of IBM's Web facilities. In 1998, 15% of IBM's education and training was done via Web-based distance learning. In 1999, this figure is expected to rise to 30%, with $100 million in savings.

Knowledge management includes personalized news feeds from internal and external sources as well as creation of communities so that people can share thoughts, techniques, and other intellectual capital. IBM also provides the usual self-service offerings for human resources aspects, such as enabling employees to check on 401K and medical programs.

BUSINESS PARTNERS

IBM has several initiatives under the rubric e-care for its business partners. These include the following:

- PartnerInfo enables business partners worldwide to access product and marketing information in 10 languages.
- PartnerCommerce provides users with the ability to check on supply status, purchase products, and track orders. The Gray Sheet notes this capability is rapidly becoming a competitive requirement, but it also translates into healthy cost-avoidance figures.
- IBM's Global Financing's Internet Financing Tool allows two-hour approval for purchases from partners instead of two days in the previous manner. IBM's Quickship can process order information that once took 20 days and 10 "touches" in five minutes and one touch, providing overnight or two-day delivery.

In 1999, IBM expects its partners will be able to purchase nearly all of its products on the Web, with anticipated revenues of more than $4 billion.

Influencers

IBM provides tailored Web sites for its key influencers and has used the Web the past two years to hold quarterly earnings calls with security analysts. The traffic on such sites can be considerable. For example, the press room gets almost 120,000 page views per month, and investor relations gets 400,000 page views per month around quarterly earnings.

Global Services Benefits

Interestingly, the Global Services unit of IBM has benefited from IBM's e-business effort in several ways. IBM outsources its entire Web infrastructure through IBM Global Services, including Web servers, data centers, networks, and workstations. This e-business background has direct benefits to IBM customers in terms of experience, capability, and offerings.

To sustain the fast growth in its services business, IBM formed an extranet of potential subcontractors to streamline the procurement of more than $3 billion a year in part-time programmers, engineers, and project managers. By broadcasting its requirements via the Internet, it is able to produce a qualified list of potential subcontractors in 3 days instead of 10. This faster turnaround makes Global Services more competitive.

In addition, Global Services is now offering the centralized requisition catalog capability to its clients.

The New Group

IBM formed Enterprise Web Management to make IBM an e-business. As head of EWM, Anderson reports to both the CIO, who also is charged with business transformation, and the head of IBM's worldwide sales and distribution.

As a first step, the new group had to get its arms around the size and scope of the challenge/opportunity. The group discovered a beehive of Web activity within IBM. There were 175 organizations creating content and more than 1,000 sites.

Realizing at the outset that Web presence represented an extension of its brand, the group knew it wanted to create a single Web presence and a rational implementation strategy. The EWM staff formed four competency areas to tackle the challenge:

- Production (including look and feel)
- Global Web architecture
- Commerce
- Change agents (leadership practices)

As a result, there are now seven major server farms around the world run by IBM Global Services that handle site hosting, applications, and measurement tools. The company has also consolidated its commerce applications around two or three commerce engines, down from more than a dozen previously.

Despite identifying ROI aspects, in an undertaking of this scope it is essential to have CEO endorsement, Anderson observed.

The Application Ecosystem: Ten Lessons Learned

Vendors can learn survival skills from patterns of functional and dysfunctional software industry relationships. Here, *The Gray Sheet* offers definitions of ecosystem roles followed by lessons learned from interactions among ecosystem players. The model can be applied beyond enterprise applications.

The application ecosystem is "a model of potential software vendor-vendor relationships" that follows the natural flow of information across related packaged enterprise software. The term, which IDC coined in 1995, has proven a rich model. IDC predicted, "The combination of application vendors seeking added value and vendors of complementary software seeking channels is likely to cause more relationships to be forged along these lines. In the future, a vendor's network of alliances, as much or more than its product investment, will become the major defense against potential competitors entering the market."

The broad solution led by an application software leader and extended through complementary software has won out in the marketplace.

The dynamics of ecosystem formation and nurturing can be violated only at the peril of leaders or complementors, as IDC's 10 lessons show. In the future, boundary wars are likely to emerge. Ecosystem leaders will seek to broaden their core to avoid commoditization, inviting inevitable conflicts with partners that have staked out a complementary market. The complementors have an initial window of opportunity before the leaders move in. Major battlegrounds in the boundary wars are analytic applications, Web-commerce applications, and supply-chain collaboration.

Ecosystem Leaders

The application suite providers (SAP, Oracle, PeopleSoft, and Baan) have been the most successful ecosystem leaders and, not coincidentally, the leading enterprise application vendors. These suppliers have the broadest integrated core and the strongest set of complementary partners. At the same time, complementary partners that understood the dynamics of the model have done well, taking maximum advantage and leverage from their relationships with many ecosystem leaders. These vendors include Cognos, Business Objects, Seagate/Crystal, Edify, Arbor, and IBM/Lotus.

Ecosystem Roles

An ecosystem is a community of product suppliers, comprising an overall leader and the providers of complementary products that add value by integrating with the leader's product to form a solution. The following points describe the three roles in an ecosystem:

- **Leader.** Gains competitive advantage by completing the "whole product" more successfully than rival ecosystem leaders. A leader generally makes up at least 60% of a solution's value and defines the interfaces (APIs) to which other vendors (i.e., complementors) must write.
- **Complementor.** Gains access to the installed base of one or more leaders, often seeking to exploit an indirect channel; the complementor's value to the overall solution may be less than 25% for a secondary complementor or less than 15% for a tertiary complementor.
- **Packager.** Brings solution elements together, often as a means to gain systems or services business.

Strategic Complementors

Many types of relationships exist between leaders and complementors. The complementor in an ecosystem is more likely to highlight strategic relationships with leaders than to be included in a large catalog of vendor partners. These strategic relationships include the following:

- **Embedded.** Complementary software from third-party ISVs that is embedded within the leader's core product (e.g., databases). An example is Visigenic's object request broker, which is embedded, integrated, and then relabeled as Oracle's application broker.
- **Distributed.** Complementary software from third parties that, though not embedded, is distributed by the leader. An example is SAP's distributing of HAHTsite Web development software.
- **Bundled.** Major software products that are bundled as part of a separately labeled product by the leader, which also offers the first line of support. One example is Oracle's bundling of Manugistics within Oracle CPG.
- **Codevelopment.** Software vendors that have entered strategic codevelopment agreements with the leader but that have no embedding or distribution agreement. Examples include SAP and the modeling vendor Intellicorp or PeopleSoft and the retail applications vendor Intrepid.

Recently, there has been an increase in the number of acquisitions of complementary vendors by ecosystem leaders, such as Baan's acquisition of Aurum, Berclain, and Antalys; Oracle's acquisition of Treasury Services Corporation; and PeopleSoft's acquisition of Red Pepper, Campus Solutions, and Salerno Manufacturing Systems.

The number and types of relationships forged by the lead vendor give a picture of its priorities in targeting customers by extending its core software. The breadth of the solutions being formed in this fashion gives rise to viewing the leader's software as a platform around which solutions are developed. The most successful of the ecosystem leaders, SAP, attracted several thousand developers to its developers' conference in Atlanta recently, providing training on how to interface complementary software to the R/3 platform.

The Ecosystems Lessons

The relationships among leaders, complementors, and packagers are becoming more well defined. Ten principles, essentially lessons learned, were developed over several years of studying ecosystems in action. Those who violate these principles risk displacement in the marketplace. Each principle or lesson is accompanied by an example drawn from the packaged enterprise software markets, as follows:

- **The role-reversal effect.** A successful ecosystem complementor that develops a product that competes with those of the leaders it complements may jeopardize its existing ecosystem role.

  There is a delicate balance among the participants of an ecosystem. Hyperion is an example of a successful complementor, leading the market for financial consolidation (Hyperion Enterprise), budgeting (Pillar), and other financial software that complements heterogeneous core accounting packages. It was able to partner with many different accounting application vendors. However, by developing its own core financials, Hyperion attempted to shift to a leadership role. It was difficult for some of the sales force to change from selling complementary software to selling a broader solution. Now Hyperion is successfully refocusing around its undisputed core competency: accounting-related analytic applications.
- **The "requirement-is-wrong" effect.** A prospective ecosystem complementor that fails to meet all of the leader's technology requirements will be rejected in favor of its competitors.

  Sybase and SAP failed on several attempts to port R/3 to Sybase SQL/Server. Sybase did not change its software to support row-level locking, believing that applications should not be written so that they should not require this feature. The project was eventually abandoned. IBM, on the other hand, made changes to OS/400 to accommodate R/3. The result is that IBM has a growing R/3 customer base on AS/400, and Sybase (whether or not it was right on the technology point) has no share in the booming SAP market.

- **The incomplete-platform effect.** A packager with a new platform that ports the lead product in an ecosystem without porting all of the strategic complementary products will fail to gain wide adoption for its package.

  It's well understood that a major issue Digital Equipment faced in gaining acceptance of its 64-bit Alpha platform was a lack of strategic layered software. For example, the inability to get a port for the Purify software for C++ developers (supplied by Pure Atria, which was recently acquired by Rational) reduced the ability to promote the Alpha platform to application developers. Purify was not a lead product of an application development ecosystem; rather, it complements Microsoft's Visual C++. However, it was an important part of the overall solution led by Microsoft. Hence, the attractiveness of the platform Digital packaged for software developers on Alpha NT was greatly diminished.

- **The spoke-as-hub effect.** A vendor that positions and prices a complementary product as a leader will fail to participate in its natural ecosystems.

  Vendors fail to recognize that a product with many uses may still be a complementary product. For example, marketing slides for repository products positioned the repository at the center of a wheel with spokes for system management, application development, or enterprise applications. The slide implied that the repository was the lead product and each of the spokes represented a complementary product. In reality, buyers were willing to pay far less for the repository than for the software related to any one of these spokes. This showed that the repository was a potential complementor to a variety of ecosystems (each represented by a spoke). However, the repository could find its natural complementary role only if the supplier specialized the repository for easier integration with the lead product of a solution. Recent history has proven this point. One independent repository company after another has been acquired by a variety of ecosystem leaders. (For example, Viasoft acquired Rochade for year 2000 redevelopment, and Platinum Technology acquired Brownstone and Reltech for data warehousing, system management, and application development.)

- **The more-is-less effect.** A lead vendor that defines its ecosystem too broadly risks being perceived in the market as too complex or too expensive.

  Data warehousing suppliers such as Teradata or Red Brick have positioned themselves as meeting enterprise data warehousing needs and have succeeded in winning large projects. However, they often miss out on projects of smaller scope. Such projects include follow-on activities to a large implementation such as dependent data marts. IDC found that both Teradata and Red Brick need to increase their mindshare among data mart buyers.

- **The less-is-less effect.** A lead vendor that defines its ecosystem too narrowly will fail to meet the prevailing market requirements of a solution.

  For example, the data mining tools market is limited to those adopters with the expertise or resources to apply the technology. From the perspective of most would-be buyers, data mining tools in and of themselves do not constitute a solution. Many data mining vendors recognize this market reality and are now looking at participating as complementors in broader ecosystems. A broader solution includes links to OLAP tools, predefined models or templates within the data mining software, and even packaged analytic applications.

- **The ecosystem-merge effect.** When a market leader with a well-developed ecosystem successfully incorporates the core technology of a niche ecosystem's leader, the niche leader, along with its complementors, will seek new roles as complementors to the market leader.

  For example, the incorporation of spatial information management technology within relational databases threatens the ecosystems built around the more niche-oriented spatial databases. The

players in the spatial information management market have a choice: They can either fight a losing battle against the market leaders in the mainstream database market or seek to find new roles in helping mainstream market leaders spatially enable the database in addition to providing associated spatially enabled development and information access tools.

- **The componentization effect.** Successful embedded complementors combine ease of technical integration with product pricing scaled appropriately, relative to the leader's.

  Lead vendors consider the cost of integration an important factor in deciding which complementary product to incorporate. Crystal/Seagate became successful by adopting a channel-ready focus via easy component-enabled integration coupled with attractive business terms to lead vendors such as Microsoft and PeopleSoft. The company started by embedding Crystal Reports inside Microsoft's Visual Basic; now, Crystal Info is embedded in Microsoft's BackOffice suite.

- **The domino effect.** A leader that fails to incorporate a major technology shift brings its complementors down as well.

  Major technology shifts produce winners and losers not just among the leaders, but among complementors that stake their fortune with a single vendor to lead a solution. The remedy for a complementor is to hedge its bets where the outcome of a battle among leaders is still in doubt. Hence, component suppliers may be forced to support both ActiveX and Java for the foreseeable future. A complementor needs always to look at diversifying its portfolio of lead solution suppliers to minimize risk.

- **The expanding-core effect.** As market adoption of the leader's product moves to a more mature phase, the leader will seek to expand into complementary product areas, causing it to compete with or acquire its former complementors.

  For example, SAP now views planning and optimization software as part of its core rather than as complementary software. This view puts SAP into competition with planning and optimization software suppliers (which write to SAP-supplied interfaces) such as Manugistics, Numetrix, i2 Technologies, or Red Pepper (PeopleSoft). This phenomenon will be played out in other complementary areas that represent the aftermarkets to enterprise applications. Application vendors can go back to their installed bases and sell a bolt-on data warehouse, supply-chain collaboration systems, Web-commerce applications, and more. The enterprise application leaders will resist at all costs being viewed as a transactional engine only and are thus moving aggressively to complementary areas such as analytic and collaborative applications.

Future Prospects: The Expanding Core Leads to Conflict

Ecosystem leaders, complementors, and packagers ignore the 10 lessons only at their peril. By developing a vocabulary for describing their roles and interactions, vendors can better understand market behavior and avoid repeating traps and pitfalls.

The 10th principle, the expanding core effect, is one to watch especially in the future. Boundary wars are likely to emerge. Ecosystem leaders will seek to broaden their cores to avoid commoditization, inviting inevitable conflicts with partners that have staked out a complementary market. The complementors have an initial window of opportunity before the leaders move in. Major battlegrounds in the boundary wars are analytic applications, Web-commerce applications, and supply-chain collaboration. IDC will use these rules to analyze the dynamics of these conflicts as they play out in the marketplace.

— Henry Morris, Research VP, Data Warehousing and Applications

Editor's Note: Although the central order of the IT universe is seldom rearranged, it is likely that the Web will facilitate such a shift. After the shift, the above roles may still apply, albeit to a different constellation of players. The question is at what point will a company (or companies) capitalize on a new organizing principle and cause a current leader to become a complementor?

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No.18 IDC #18464 | February 11, 1999 | Molly Upton, Editor

Manufacturing and "The Force"

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IDC

In 1998, the Internet was seen as a way for upstart companies that "got it" to gain competitive advantage, and build volume (if unprofitable) businesses. A few manufacturers without a channel to dislocate — such as Dell — also "got it" and used the Internet to their advantage. Just as the advantage in *Star Wars* was held by those who were allied with "The Force," so too will the advantage in business be held by those who leverage the Internet.

In 1999, the Internet "Force" is increasingly seen as a key element in competitive advantage for all business sectors. The "Force" has the potential to impact the marketplace as well as the producer. Sequential consequences of "The Force" include the following:

- An efficient marketplace with reduced prices due to wider knowledge of competitor's prices and product availability
- Cost-efficient producers due to pressure to meet the new pricing levels
- New industry leaders that have leveraged the Internet to restructure or reinvent business to meet the market's changing dynamics

The Internet will be seen as the ruthless eliminator of market inefficiencies, and the impact on the economy could be significant. The Internet will put a tremendous squeeze on the revenues — and therefore profits — of today's organizations. However, it will also offer opportunities to improve the cost structures of doing business. More importantly, for those who "get it," integration of Internet capabilities into the business process offers a path to competitive advantage.

It's more than the same old story of leveraging technology to business advantage. Unlike previous technology waves (e.g., distributed computing, client/server, etc.), the Internet's potential impact on businesses extends well beyond a corporation's internal processes. Because the Internet can tighten the links between

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producers and customers, as well as those between producers and other suppliers, the potential competitive advantage and change in cost structure that may occur as a result of leveraging the Internet are compelling. Rarely have we seen a technology with the potential for such profound impact on the way businesses are structured. The modern business mantra may well become, "Think strategically, stupid."

In the Game

Those companies that embrace the Internet simply to reduce costs will not gain an advantage; those that look to the Internet as a means to gain competitive advantage will be in the game. The leading companies in the new economy will be those that resist the temptation to simply pave the cowpaths of current business practices, and that leverage the new capabilities to reconstruct themselves to survive and exploit the forthcoming market efficiencies.

Every aspect of business must be examined for its competitive advantage and cost. Although some companies may be able to forestall the impact of the Internet-aided efficient economy through reliance on a perceived advantage (such as superior customer relations), competitors will likely not only offer lower prices, but also use the new technology to vastly improve their customer service.

Lines will blur, and companies need to think about what businesses they are in. For example, Dell can be considered both a manufacturer and a retailer.

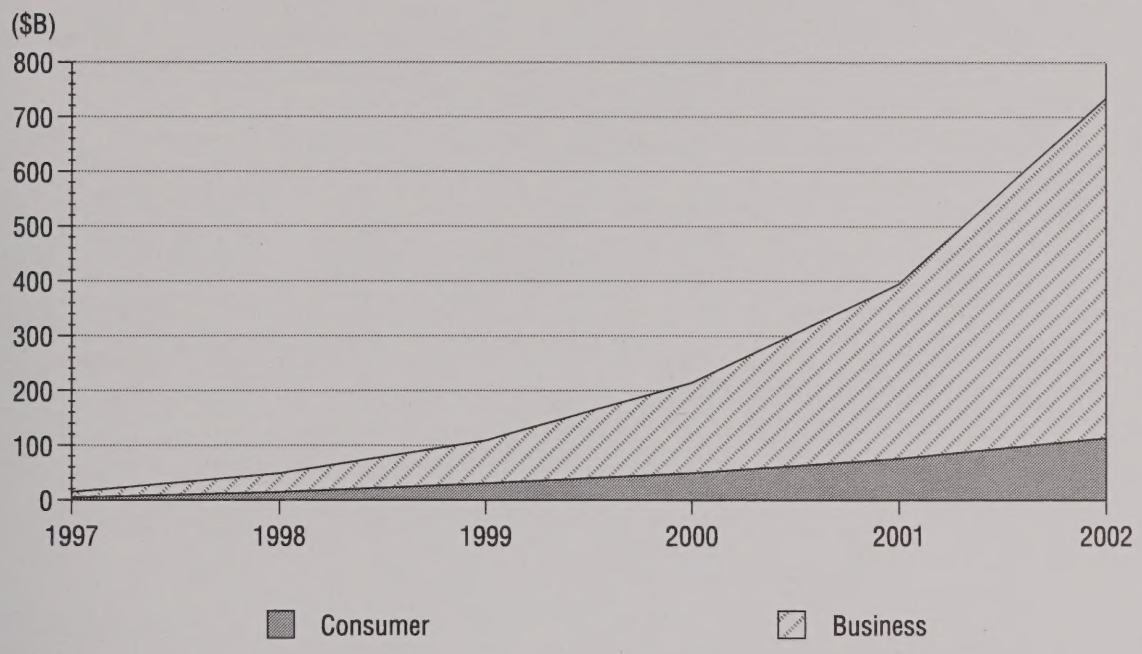
Business to Business

Although the retail sector grabbed the headlines in 1998, it's the business-to-business sector that is going to account for much of the usage of and commerce on the Internet in the future (See Figure 1).

Interesting characteristics of the manufacturing sector include the following:

- Manufacturing accounted for 27% of all 1998 U.S. corporate Internet spending (for both products and services). (For more information on this issue, see *Internet Futures Spending Model, 1997–2002: Business Gears Up forE-Commerce,* IDC# 17999, forthcoming.)

FIGURE 1
WORLDWIDE INTERNET COMMERCE REVENUE, 1997–2002



Source: IDC's Internet Commerce Market Model V. 5.0, 1999

- The discrete manufacturing sector is more eager to embrace the Internet than the process manufacturing sector.

- Manufacturers are viewing the Internet as a strategic opportunity that requires more than cost cutting. One quarter of IT the budget for both process and discrete manufacturers is being earmarked for reengineering. Also, customer care and integrating with suppliers, respectively, are the key concerns for the discrete and process sectors.

In this issue, *The Gray Sheet* examines the manufacturing sector and its preparations to leverage the Internet in the following areas:

- Supply chain automation

- The marketplace phenomenon

- E-commerce

SUPPLY CHAIN AUTOMATION

IDC defines supply chain automation (SCA) as the "electronic linking of the multiple stages in the conception, development, manufacture (if applicable), assembly, and delivery of goods and services (the product and services supply chains). IDC includes only those revenues from software packages that we believe are actively being used to automate the product supply chain. In this issue, the focus is on product supply chain automation.

SCA is the cornerstone of integration between a manufacturer and its suppliers. As such, this area should be ripe for leveraging the Internet.

With new capabilities available, manufacturers and others will have to reset their ways of looking at the world. In addition to viewing SCA as a means for driving internal efficiency, manufacturers need to see the Internet as a bridge to other trading partners that requires them to open their kimonos so others can access their SCA applications.

One company offering an Internet/SCA solution is Digital Market, whose Digital Buyer is a Web-based tool for automated ordering and logistics. Digital Buyer is designed to allow a company to handle, quote, and order transactions with suppliers via the Web. Digital Buyer interfaces with several enterprise resource planning (ERP) systems such as those from SAP, Oracle, Baan, and PeopleSoft. The software was also designed to coexist with current EDI systems, for those companies that want to use them.

The Gray Sheet expects other established SCA vendors to add Internet capability to their products.

Wide Open Market

Dennis Byron, IDC's research manager of supply chain applications services, categorizes the market for SCA handling goods (or the product SCA) as wide open because of the lack of products that provide both process and linking automation in a closed-loop, end-to-end solution. Current SCA solutions tend to optimize "unlinked" processes within the chain. In the future, according to Byron, SCA solutions "will support closed-loop automation — end to end — across two or more links in the flow of goods."

According to IDC the market for product SCA applications should grow rapidly from about $2.8 billion in 1998 to more than $15 billion by 2002, for a compound average growth rate of 52% (see *Product Supply-Chain Automation Applications: 1998 Worldwide Market and Trends,* IDC #17474, November 1998). An additional market sector for SCA use by service organizations such as banks and real estate agents is detailed in *Services Supply Chain Automation Packaged Applications: Baseline Market and Trends,* IDC #17854, November 1998.

Between 1998 and 2000, the driving factor in this market's growth is expected to be intraenterprise use. Interenterprise deployments will begin to drive year-over-year growth in the 2000–2002 window and beyond as supply chain reengineering becomes a force. If supply chain reengineering happens more rapidly than did business process reengineering, this forecast could be conservative. The market is expected to continue its dramatic growth after 2002, at which point the leading solutions will support closed-loop automation.

Product SCA capabilities support a variety of functions. For that reason, Byron expects suite suppliers to incorporate point solutions — such as optimization — and dominate the market.

Applications are also available as a service rather than as a package, consistent with the applications service provider movement (see *Web Hosting, The Gray Sheet* 33:15, November 15, 1998). IBM's TransConnect for Shipment Management and Continuous Replenishment Service are leading examples.

MARKETPLACE SITES EMERGE

The emergence of marketplace sites, a new category of brokering facility, could provide an e-commerce functionality to companies that may lack an e-commerce system of their own. The marketplace sites have the potential to extend the reach of e-commerce facilities to companies lacking an in-house e-commerce system. They can also serve as showplaces for extensive and sophisticated e-commerce implementations.

Given the relatively conservative plans by process manufacturers to construct their own e-commerce efforts, it is plausible that marketplaces could find a prime market among these companies.

Marketplace sites bear little resemblance to auction sites; they place heavy emphasis on the traditional steps involved in establishing a trading relationship in the business-to-business world with a major company.

IDC has observed that marketplace sites share the following attributes:

- They help buyers find several suppliers of a particular material or component.
- They provide a sales arena for surplus material.
- They incorporate existing sales agreement parameters between the buyer and the site. These sites are geared toward volume purchases.

The marketplace sites generally are set up in one of two ways: Either the potential buyer selects a company with which to do business and then looks for a particular product, or the potential buyer indicates the product sought and receives a list of such products from a variety of firms.

The Chemdex.net site has devised a means for assembling various products from a number of manufacturers into appropriate categories. Chemdex.net is designed to eliminate the hours of thumbing through various hefty catalogues in search of a particular item.

Some sites, such as Chemdex.net, offer software that purchasers may use that ensures use of previously negotiated pricing with particular suppliers.

Chemdex.net was founded in 1997 as a private corporation to serve the life science research industry and four customer groups: scientists, commercial organizations (such as pharmaceutical and biotechnology firms), non-profit organizations (such as academic and government institutions), and life science suppliers.

Whereas Chemdex.net can accommodate existing pricing agreements between parties, NetBuy offers electronic components for spot market or small quantity purchasing requirements and carries inventory listings of several distributors such as Bell Microproducts, Jaco, and Ingram Micro. Electronet, another player in the electronics arena, enables engineers to find needed parts for small lot ordering. Another marketplace site, Digital.Market.com, is geared to enable purchasers to obtain competitive quotes and place purchase orders for large production quantities.

While steel companies may not come to mind in connection with cooperation and e-commerce, three steel companies, LTV Steel, Steel Dynamics, and Weirton Steel Corp., have combined resources to create metalsite.net, which provides a secondary market in surplus steel.

A wide range of businesses are also beginning to take advantage of what the Internet has to offer. Some other new sites are agrimall.com (agriculture) and PaperExchange.com.

AIAG.org is the site of the Automotive Network Exchange, which is backed by the Automotive Industry Action Group (AIAG). It is taking a different twist, by starting out providing a virtual private network for its trading members.

These marketplaces are a logical element of the e-commerce movement. Jim Manzi was too early with Nets Inc., the assets of which were acquired by Perot Systems.

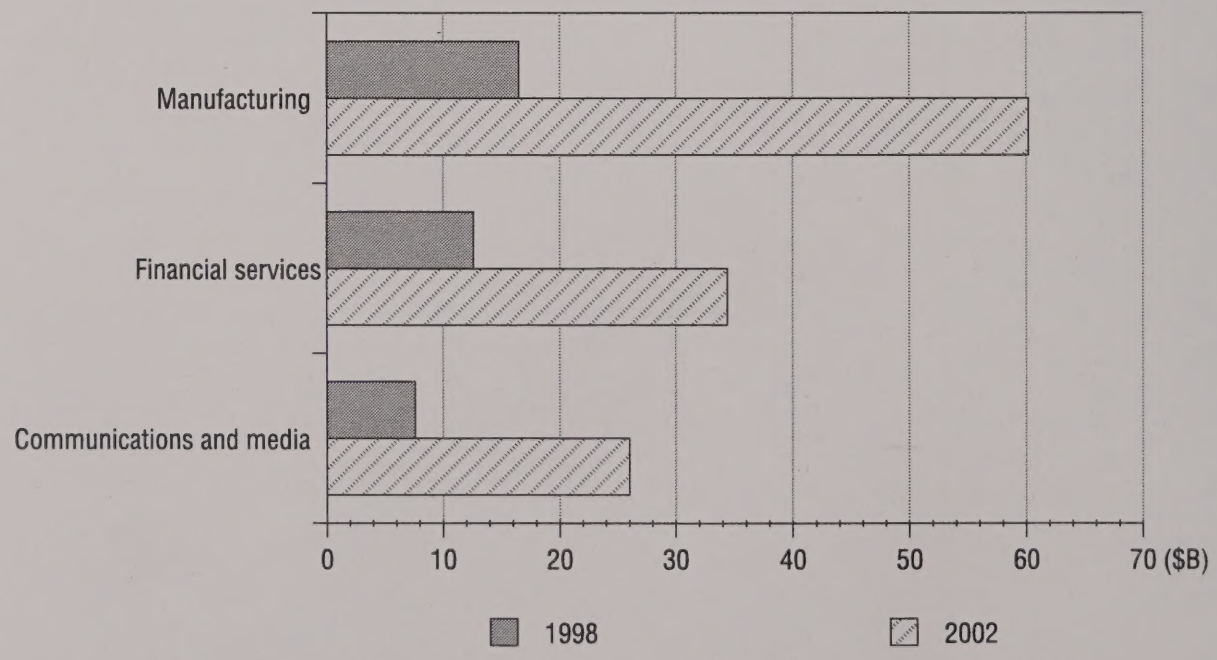
Manufacturing Efforts

How is manufacturing — one of the nation's largest sectors — adapting to the prospect of the Internet? As befits its size, the manufacturing sector is and will continue to be the largest source of U.S. corporate Internet spending.

In each year between 1998 and 2002, U.S. manufacturing will account for more than 27% of corporate Internet expenditures. With a compound annual growth rate between 1998 and 2002 of 38.2%, manufacturing's share of all corporate Internet spending will continue to increase.

In 1998, the manufacturing sector spent more than $16 billion on Internet-related products and services. According to IDC's Web Spending Model (See Figure 2), this amount will grow to slightly more than $60 billion by 2002.

Figure 2
Major Players in U.S. Corporate Internet Spending ($B)



Note: This figure shows only three segments of 13; the totals for all 13 segments in 1998 and 2002 were $60.4 billion and $203.3 billion, respectively.

Source: IDC's Web Spending Model, 1998

In 1998, manufacturing began to pull further ahead of financial services in terms of Internet spending (See Figure 3).

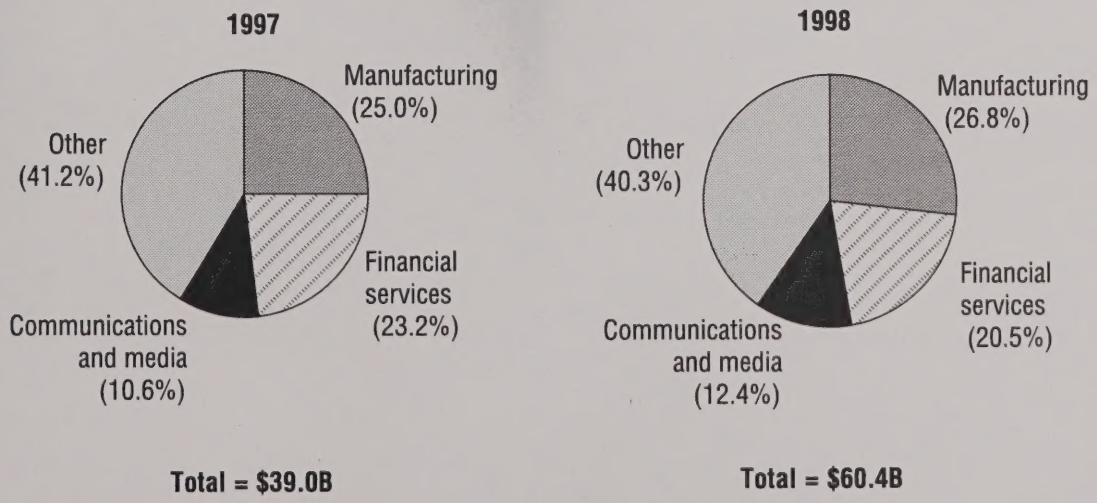
Companies that regard the Internet as an opportunity to improve and evolve their businesses will be more successful in the long run than those that view the Internet simply as a tool for cutting costs. Manufacturers appear to fall in the former category.

As part of IDC's ongoing effort to discern user thoughts and spending patterns, 909 U.S. and Canadian companies were interviewed at midyear 1998 in IDC's Technology Integration Panel Study (TIPS).

What drives manufacturers? When asked to name their top corporate priorities over the next 12 months, both discrete and process manufacturers mentioned the drive to increase productivity. The second most frequently mentioned top priority was introducing new/improved products, according to *Business Priorities, Internet, and E-Commerce Activities: TIPs results by Company Size and Industry* (IDC #16796, August 1998). The manufacturers in the study planned to back up these priorities by allocating about half their IT budget to improving operating efficiency, and about one-quarter of their budget to long-term business process.

Manufacturers are edging toward e-commerce, and appear to be beginning to use the Internet for purchasing and selling goods. The discrete manufacturers are more avid adopters of e-commerce, both now and in the future. More than half the discrete manufacturers in the study are either using, implementing, or have a future need for an e-commerce system. Eleven percent indicated they

FIGURE 3
MANUFACTURING WIDENS LEAD IN U.S. CORPORATE SPENDING, 1997 AND 1998



Source: IDC's Web Spending Model, 1998

regularly use or are in the first stages of using an e-commerce system. However, nearly half the process manufacturers said they see no future need for an e-commerce system (see Figure 4).

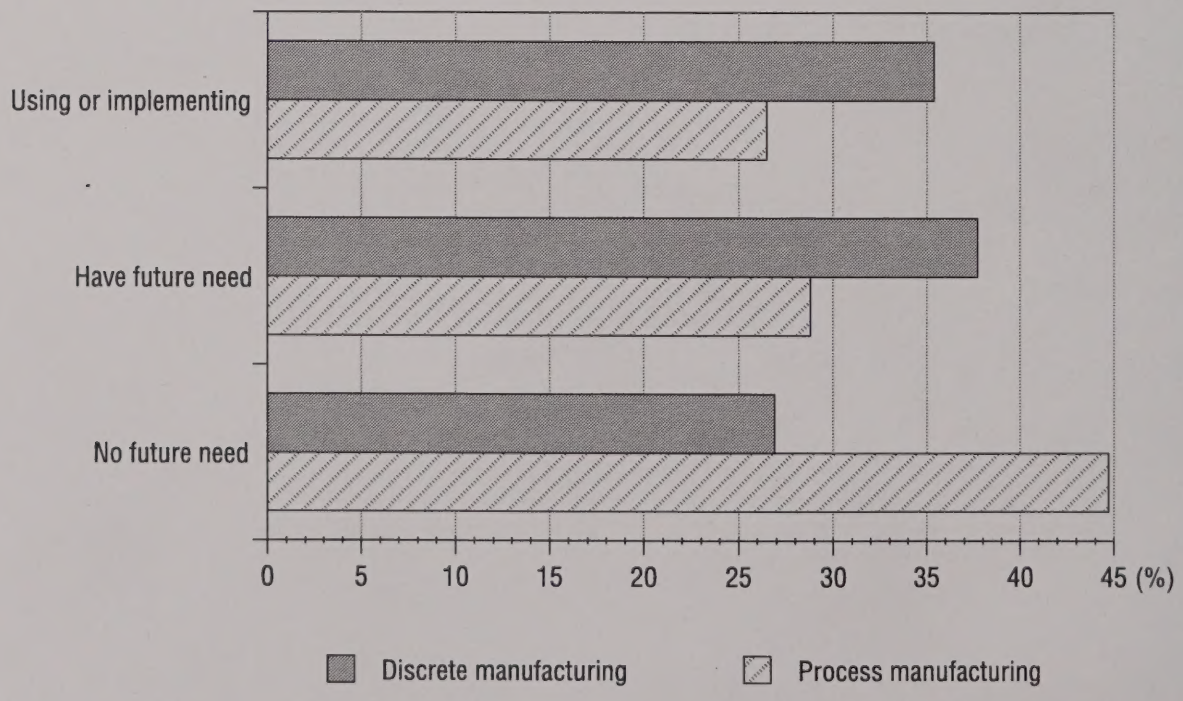
The advent and evolution of the marketplace phenomenon may facilitate much wider use of e-commerce systems than is indicated by the above responses, which represented corporate use of e-commerce systems.When manufacturers were asked specifically about buying and selling goods via the Internet rather than about their thoughts on the use of e-commerce systems, the responses were somewhat different.

Buying vs. Selling

In both the discrete and process camps, more manufacturers in the study are purchasing goods over the Internet than are selling goods over the Internet. In each group, about half said they purchase goods via the Internet, but less than one-fifth said they currently sell via the Internet.

Regarding future intentions, more than one-quarter of firms in both sectors said they plan to purchase products via the Internet. About one fifth indicated they did not plan to use the Internet for purchasing. In the less popular area of selling via the Internet, the discrete manufacturers tend to be more enthusiastic than the process manufacturers. In both the process and discrete areas, less than one-fifth of the manufacturers currently use the Internet for sales. However, more than 40% of the discrete manufacturers plan to use the Internet for sales, while only one quarter of the process manufacturers plan to do so. Finally, more than half the process manufacturers said they have no plans to sell over the Internet, compared with 38% of discrete manufacturers.

Figure 4
Manufacturing Adoption of E-Commerce, 1998



Source: IDC's Technology Integration Panel Study, 1998

CHOICE OF E-COMMERCE PLATFORM

Computing platform choices for e-commerce differ somewhat by manufacturing sector. In both the process and discrete sectors, the most popular platform is Windows NT server, which is used by 53% of discrete and 37% of process manufacturers. Unix systems are the second-most-popular choice in both camps at 17% of discrete sites and 32% of process sites.

But the discrete manufacturers were more likely (7.4%) to use large-scale systems compared with process manufacturers (3.9%). Conversely, Unix systems are found at more process sites (32%) than discrete sites (17%).

Among those manufacturing respondents engaged in e-commerce, slightly larger percentages said their e-commerce information repositories reside within Web server databases than system databases (see Table 1).

When asked what packaged applications they purchased with their e-commerce solution, as one might expect, the process control manufacturers said they were less likely to buy additional packaged software. This is not surprising because many of these firms have either developed or acquired specialized software tuned to their distinct manufacturing needs.

Perhaps because they generally wrap fewer other applications into their e-commerce purchase, more than half (51.5%) of process manufacturers that have acquired e-commerce systems said they bought their system with little or no modification compared with only 37% of the discrete manufacturers.

Few e-commerce vendors are being evaluated by firms in both sectors. These include IBM, Microsoft, integrated suppliers, ISPs/NSPs, and "Other." Interestingly, the two types of manufacturers ranked different elements as their most important criteria for investing in e-commerce solutions. Responses were rated on a scale of 1 to 11 with 1 being not at all important and 11 being extremely important.

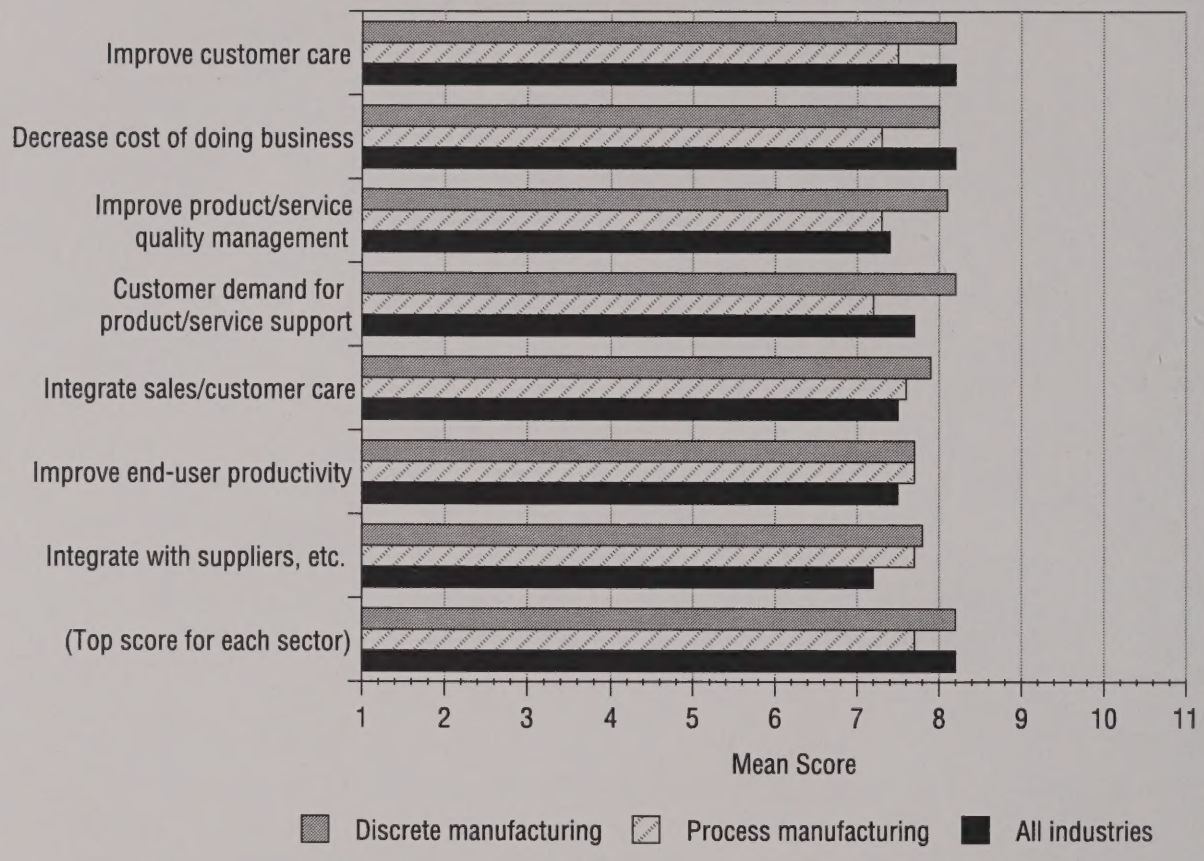
The discrete manufacturers said the most important criteria are improved customer care, customer demand for product/service support, and improved product/service quality management. The process manufacturers rated two items as equally important: integrate with suppliers and improve end-user productivity (see Figure 5). These results illustrate once again that these two sectors have their own sets of priorities.

TABLE 1
E-COMMERCE REPOSITORIES USED BY MANUFACTURERS, 1998 (%)

	Discrete Manufacturing	Process Manufacturing
Web server database	35.3	29.2
System database	33.6	23.2
Enterprise data warehouse	14.6	11.6

Source: IDC's Technology Integration Panel Study, 1998

Figure 5
Mean Criteria Scores for Investing in E-Commerce Solutions, 1998



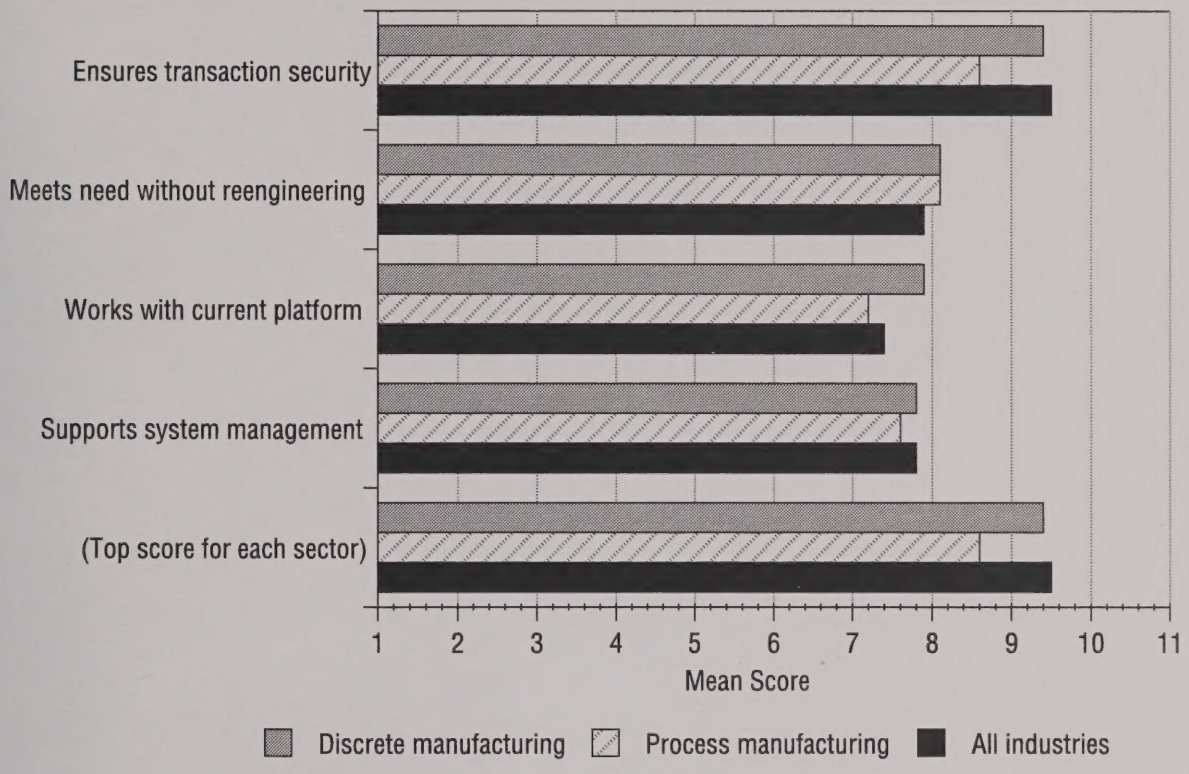
N = 909

Note: Scale of 1 to 11, with 1 being not at all important and 11 being extremely important.

Source: IDC's Technology Integration Panel Study, 1998

The two manufacturing sectors were in relative agreement when they graded scores for e-commerce application purchase criteria. Again on a scale of 1 to 11, each sector attached the most importance to transaction security, followed by a system that meets need without reengineering. (See Figure 6)

FIGURE 6
MEAN CRITERIA SCORES FOR E-COMMERCE APPLICATION PURCHASES, 1998



N = 909

Note: Scale of 1 to 11, with 1 being not at all important and 11 being extremely important.

Source: IDC's *Technology Integration Panel Study,* 1998

News of Note:

Let's Make a Deal

Microsoft has been busy with small deals with Banyan and Compaq's AltaVista involving "technology exchange." Can these be anything other than a camel putting its nose under the tent? What is involved in deals such as these that include technology-sharing arrangements or agreements to work together?

Just when directories are starting to get respect, Banyan rolls over and aligns itself with the Microsoft camp as a supplier of NT support. Carefully crafted to fly below the U.S. Justice Department's radar, Microsoft's complex agreement, if exercised, would net it a 7.5% stake in Banyan.

Isn't this move akin to a bite in the hind haunches of Banyan, thereby spoiling it as fresh prey for any other would-be acquirer? Microsoft's phased plan would buy just enough of Banyan to deter other potential acquirers such as Novell or Cisco. In addition, Microsoft seems to have its claws embedded in Banyan through a three-year lock-up provision that would appear to give Banyan a lot of incentive to remain aligned with Microsoft. Microsoft agreed to buy 1.75 million common stock warrants at $10 each, subject to a lock-up provision based on continuation of the alliance. Microsoft also will infuse $10 million into Banyan over three years for training at least 500 professionals, and for marketing and product development.

Banyan's Streettalk set a standard in easy-to-use directories that hasn't been challenged, but better marketing by Novell and Microsoft has taken its toll.

What exactly is meant by the technology-sharing agreement between the two firms? Although Microsoft avows that it is committed to its Active Directory for NT, it occurs to *The Gray Sheet* that one way for Banyan to assist in the migration of its base to NT would be to add some Streettalk code to the Active Directory. Remember that Jim Allchin, Microsoft's NT guru, was a Banyan designer in his previous life and has a good idea of the strengths of Streettalk.

Banyan Chairman William P. Ferry described Banyan as "in transition" to being a services firm, leading one to suspect that those expecting future releases of Streettalk are naïve at best. The Switchboard product line at Banyan is unaffected by the agreement with Microsoft.

As part of its announcement making AltaVista a separate subsidiary in preparation for an IPO, Compaq mentioned a handy quid pro quo with Microsoft, in which Microsoft Network (MSN) is installing AltaVista as its search engine (booting Inktomi). AltaVista will offer Microsoft's Hotmail and, later, Microsoft instant messaging. And there is also an agreement to work together on a range of other "communications and community building services."

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No. 17 IDC # 18298 | January 22, 1999 | Molly Upton, Editor

Internet Banking Software and Service Vendors: Change Agents

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As banks prepare to enter the 21st century, they are responding to consumer demand to use the Internet as the medium to conduct personal finance transactions.

The nascent market for service providers and vendors of online banking applications will start to explode in 1999. The combined revenues of Internet banking applications and services will grow at a compound annual growth rate of 272% between 1998 and 2000, from $193.8 million to $2.67 billion.

The Internet banking services market will rapidly eclipse the Internet banking applications market in revenues. Starting from a 50-50 split in combined revenues in 1998, by the year 2000, services will own a 75% share of the U.S. revenues at $2 billion. A portion of these revenues will be from transaction-based fees.

Many banks are responding to the demand by building sophisticated Web sites with interactive features. For example, Wells Fargo, one of the first major banks to invest in the Internet, recently told Wall Street that its online customer base grew to 650,000 in December 1998 from 20,000 in 1994. However, only a small number of banks have full transactional capabilities on their Web sites.

The rapid growth in banks' adoption of the Internet in 1998–2000 is in contrast to 1997, when Web-based systems spending at banks was relatively low. According to IDC's most recent Global IT Survey, banks spent 4.1% of their IS operating budget on Web-based systems in 1997 — while insurance companies spent 8.3% of their budgets on such systems.

There are signs that banks are paying closer attention to the Internet as an important channel through which to deliver services. Last year saw the rapid expansion of the online banking applications and service markets, which barely existed a year earlier.

THE GRAY SHEET

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Some of the key trends within the banking arena include the following:

- **Applications sales will soar.** U.S. sales of Internet banking applications reached $96.5 million in 1998, up from less than $20 million in 1997. In 1999, the market is expected to grow 250% to $337.8 million due to widening acceptance of the Internet and tremendous changes in the financial services industry that will leave banks, insurers, and brokerages competing for customers in a free-for-all environment.

- **Service revenues will grow faster.** As many banks turn over the development and hosting of their Web sites to outside firms, the revenues for these service providers are expected to grow 592% to $674 million in 1999 (see Figure 1). Service revenues will continue to outpace license sales as bank Web sites attract new users.

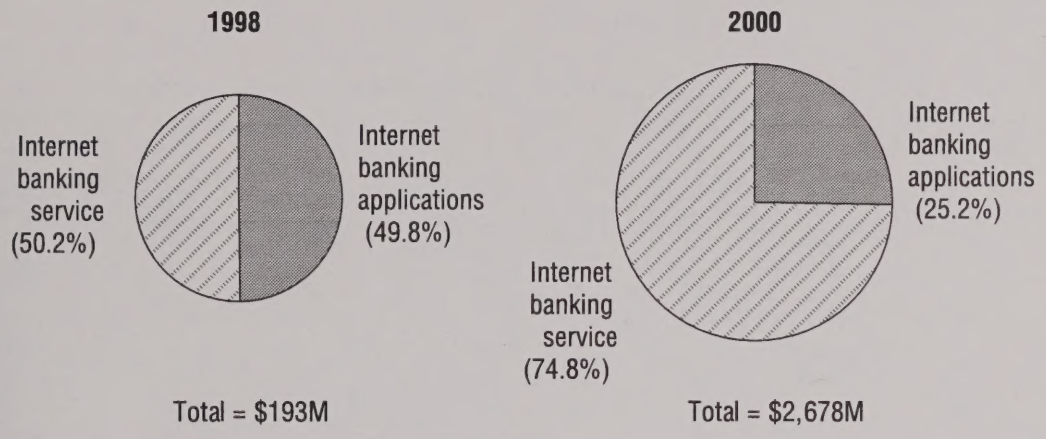
- **Internet banking will play a critical role.** While the U.S. banking applications market is growing at a tepid 9.5% annually, Internet banking software sales will be outstripping that number and will account for nearly one-third of the total banking/finance application revenues by 2000 (see Figure 2).

- **Market acceptance.** Banks, despite their risk-averse tradition, are beginning to embrace the Internet to deliver financial data to consumers and businesses on a real-time basis so that they can view and pay bills, transfer money between accounts using their ATM passwords, or even complete complicated cash-management tasks such as wire transfers.

- **The pitch.** More than two dozen vendors and service providers have started to capitalize on the online banking applications marketplace. The pitch from these vendors is simple: Turn your bank into a virtual financial center that can deliver the offerings of any physical bank as well as the ability to cross- or up-sell financial products from car loans to 401K plans.

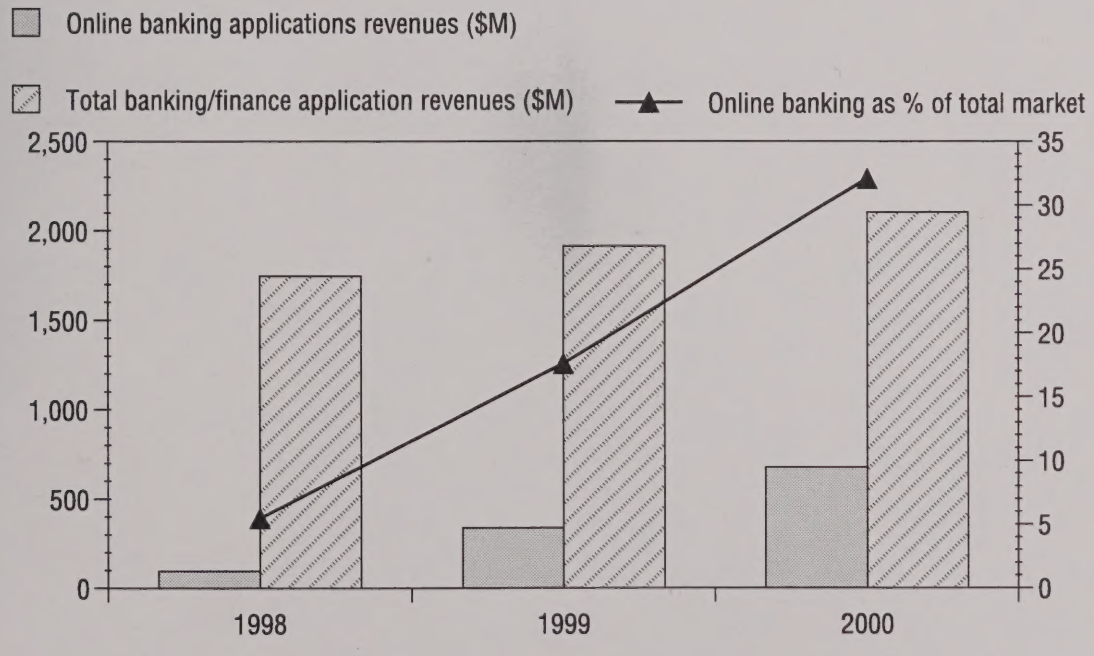
In an era when a premium is paid for any product or service that can win customer loyalty, these online banking solutions — with prices ranging from $895 at SBS Corp. to a few million dollars at Security First — are being touted as the panacea for banks looking to simultaneously increase market shares and retain existing customers.

FIGURE 1
U.S. REVENUES OF BANKING APPLICATIONS AND SERVICES, 1998 AND 2000



Source: International Data Corporation, 1999

FIGURE 2
U.S. INTERNET BANKING APPLICATIONS SOFTWARE GROWTH, 1998-2000



Source: International Data Corporation, 1999

MARKET OPPORTUNITIES

More than 1,200 U.S. banks and credit unions signed with online banking applications vendors and providers to build fully transactional Web sites in 1998, according to IDC estimates. This year, 7,200 banks and credit unions are expected to acquire online banking applications and services, at a total cost of $1 billion. A fully transactional Web site allows bank customers to complete certain kinds of transactions over the Internet, such as bill payment, fund transfers, and stock purchases.

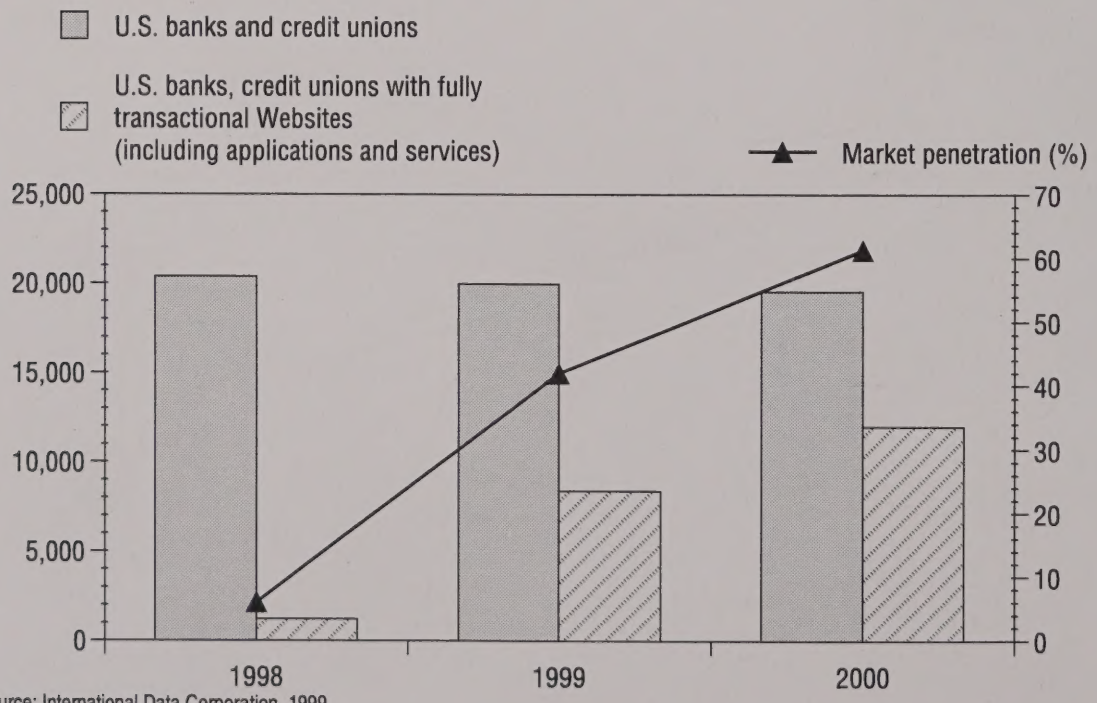
The return on such investments is encouraging. For example, at Digital Credit Union in Maynard, Massachusetts, more than 15,000 of its 90,000 customers now access its Web site regularly for information about their accounts. In addition, Digital Credit Union's Web site generates between 2,000 and 2,500 loan applications in a given month; these applications were processed manually in the past.

In Madrid, Spain, Bankinter recently launched its Web site and, within two weeks, had signed up 5,000 users, creating 15,000 transactions. Today, Bankinter's site has more than 60,000 users, or 10% of its customers, and generates $100 million worth of transactions every month.

The steep growth of the online banking applications market is likely to continue for another 18 to 24 months. One reason is that some of these projects could take as long as six months to complete, depending on the complexity of a bank's operations and its requirements. Other vendors are hoping to accelerate growth through quick deployment. First Data, for example, is touting its capability of building a fully transactional bank Web site in 30 business days for $30,000.

There are an estimated 9,000 banks and 11,000 credit unions in the United States. IDC projects that 42% of them will have fully transactional Web sites by the end of 1999 (see Figure 3).

FIGURE 3
U.S. INTERNET BANKING MARKET OPPORTUNITIES, 1998-2000



Source: International Data Corporation, 1999

Although there will be continued consolidation in the banking industry, the pace is expected to moderate because of the emergence of technologies that provide a more effective and cheaper means for banks to expand. By relying on the Internet, banks are able to sell products in faraway markets — and end previously achievable only through the acquisition of local banks or by building expensive branches and ATM machines.

The bottom line is that online banking applications may well be a powerful tool for banks seeking to attack their weaker competitors while fending off threats from anyone that tries to invade their territory.

The biggest competition for online banking applications companies and service providers remains in-house development efforts. Conservative financial institutions have long considered internal technology development a sacred part of their operations because of its strategic importance. However, the need to compress time to market, the shortage of skilled programmers, and the trend toward outsourcing are all making internal development an increasingly unattractive option for banks.

For those financial institutions that are willing to use commercial applications, the payoff could be substantial. Security First, a major Internet banking vendor, estimates savings of at least 50% for banks that go with an off-the-shelf package rather than building their own Internet banking solutions.

Internet Banking Applications Vendors

Internet banking applications vendors include companies such as Broadvision, Corillian, Edify, Home Account, Home Financial Network, Jack Henry & Associates, Open Solutions, Phoenix International, and Prologic. These vendors typically charge at least $100,000 to set up a bank Web site. Jack Henry is the exception; it charges $40,000 for its Net Teller module, which can only be run on its proprietary core processing system.

After the launch of a site, these vendors do not charge a recurring fee for each bank customer who uses the Web site. Instead, they charge an ongoing maintenance fee that ranges between 15% and 18% of the price of the applications.

These vendors will build a Web interface for the banks, focusing on such qualities as personalization, product differentiation, and customer relationship management.

The Windows NT Factor

As an increasing number of banks are severing their ties to mainframe systems by adopting a distributed computing environment, new opportunities have arisen for companies such as Corillian, Open Solutions, Phoenix International, and Prologic. With their NT-based client/server solutions, these vendors have transformed the core processing operations at scores of banks and credit unions. "Core processing" refers to the way banking software handles a bank's core accounting functions (such as general ledger). The need to deliver real-time data to their customers online has reinforced banks' commitment to run their data centers with powerful relational databases like SQL Server and Oracle.

Vendors like those mentioned above are betting that the databases will become so versatile that a whole range of executables and applications will be embedded in them and users will be able to make direct queries over the Internet to obtain customized information, bypassing the need to search for data from some legacy applications.

This idea is particularly appealing to banks that are smaller but more technically savvy. For example, Crews Banking Data Center, which has three banks in Florida, chose Phoenix International to overhaul its core processing system and add new features like Internet banking. Compubank, an Internet-only bank, chose Prologic to handle its back-office operations.

Internet banking solutions may become an important selling point. For example, Savings Bank of Manchester in Connecticut installed the Internet banking module from Open Solutions along with its Complete Banking Solution. The entire project cost close to $1 million, but Savings Bank expects the system to yield savings of more than $500,000 a year.

Despite such implementations, many of the nation's top 100 banks have steadfastly held onto their mainframes and considered the Internet banking applications quite distinct from their core functions.

That's where middleware offerings such as that from Corillian come into play. Corillian's Voyager platform will connect a bank's mainframe and a Web front end hosted by an interface vendor such as Home Financial Network. This could become a viable alternative for banks that want to straddle the old world and cyberspace.

Internet Banking Service Providers

Service providers have always played a pivotal role in the banking industry. Vendors such as Electronic Data Systems and Fiserv have been handling the core processing tasks for large and small banks for decades. Over the past two years, a new wave of service providers has entered the marketplace, fulfilling the Internet banking requirements of these institutions. These providers include companies such as Integrion, Security First, Digital Insight, Q-Up, nFront, Virtual Financial, Fundsxpress, First Data Direct Banking, and Online Resources Communications Corp.

For an initial implementation fee of $20,000 or more, these providers can set up and host bank Web sites. Some of these service providers, such as Online Resources, offer proprietary applications. Others, like M&I Data Services, license applications from vendors such as Security First and resell them to their customers.

After their sites are launched, the banks pay the service providers anywhere from $2 to $5 per month for every customer who signs up for the service. Today, a recurring fee of $3 per user per month seems to be the norm, but it can fluctuate if volume discounts are offered or banks have additional requirements such as bill payment or 24 × 7 technical support.

Key Trends for 1999

Trends in the market for Internet banking applications and services include the following:

- Consolidation
- Real-time access
- Customer relationship management
- Commercial banking service

Consolidation

Currently, more than two dozen vendors are providing applications, hosting service and turnkey solutions to create fully transactional Web sites for North American banks and credit unions. However, that number is expected to decrease in the next 12 to 18 months as the pace of consolidation among suppliers continues.

In September 1998, HNC Software acquired Open Solutions (OSI) in order to beef up its client/server banking offerings. Earlier in the year, Intelidata invested $5 million in Home Financial Network, while Broadvision and Security First Technologies swapped shares to form a strategic alliance.

In addition, core processing companies such as Alltel and Fiserv, which have limited presence in the online banking applications market, will begin making heavy inroads either by developing their own products or by acquiring vendors that have proven solutions and customers.

Real-Time Access

Increasingly bank customers will want real-time access to their financial records. As a result, banks that run their Web sites in batch mode will find themselves unresponsive to users who need real-time access to information for transactions like stock trading, shifting funds between accounts, and participation in electronic commerce around the clock.

A number of online banking applications companies continue to deliver data in a batch mode primarily because of the difficulties of replacing legacy applications with real-time systems based on client/server systems. Security First estimates that only 25% of its Internet banking solution clients are delivering real-time data to their customers.

IDC believes the likely winners in the online banking applications market will be those that can quickly convert a bank from a legacy environment to one that can offer Internet transactions on a real-time basis.

Customer Relationship Management

The key to success for any online banking applications company will lie in its ability to give banks not just an online platform, but also a high degree of product differentiation. A Web site will then become a bank's strategic weapon to win and retain customers. Customer relationship management tools that enable banks to practice target marketing and customers to configure their own personal finance services will be increasingly important.

Vendors are preparing to offer such products. Bowne, for example, has acquired a number of Internet developers, including Open Sesame, Mountain Lake, and Quadravision, so it can offer end-to-end customer relationship management solutions to financial services companies.

Commercial Banking Service

Online banking is expected to spread to business users, particularly small firms that want to complete via the Internet such tasks as wire transfers, interactive stop payments, and detailed reporting with bank statements dating back a few years. For example, Q-Up estimates that one-third of its banks have been offering cash management features online.

Big core-processors are getting into the game as well. Fiserv and Politzer & Haney will start offering an array of online cash management services in the first quarter of 1999.

However, online cash management for corporate customers will be a tough market to crack because of the need to tailor the solutions for individual businesses. Because the value of corporate banking transactions tends to be greater and the customers are more likely to demand personal service, the Internet may not be considered the most user-friendly channel for delivery of online cash management services.

CONCLUSIONS

The future of the Internet banking applications marketplace is promising because these products will enable banks to hold onto their accounts, identify retention risks, and determine whether online users are actually more loyal than regular customers.

Vendors must add more intuitive and personalization features to their applications and service offerings, and they also must be prepared to share the rewards and risks of building a virtual financial center for their clients.

These vendors might also have to deliver applications that could transform a bank into a portal site or an active selling entity on the Internet. A likely scenario involves selling vacation packages on a bank Web site, allowing purchasers to apply for a special-interest loan to fund their trips. But some risk-averse banks may question whether this selling technique would hurt their loan portfolio. If banks reject such ideas because they run contrary to the traditional definition of a bank, growth of these products could be stifled.

Still, the tremendous changes in the financial-services industry are forcing banks to diversify. As more online banking application vendors add insurance policies, stock trades, and other personal finance services to the bank sites they're hosting and developing, their revenue will be coming increasingly from transactional fees and development work. The result is that for every stock trade handled by a vendor like Digital Insight for a credit union's customer, and for every loan package a vendor like Digital Insight is involved in closing, the service provider will get a commission.

However, there is a catch. Not every bank would want to see a third-party company take a big chunk out of its revenues if its Web site proves to be hugely popular. Some banks may even find this commission structure punitive.

In the future, the profitability of online banking applications vendors and providers will be closely linked to the ultimate success of bank Web sites. Currently, a Web site costs a bank anywhere from $20,000 to $100,000 to set up and another $3 per month for every customer it is able to sign up. However, the majority of banks can attract only 5% to 10% of their customer base to their online offerings and instead must continue to rely on expensive existing channels like bank tellers and ATMs to serve the bulk of their customers.

Consequently, banks will want to share with applications vendors and providers the costs of acquiring online users. As an executive at Open Solutions pointed out, banks will probably end up paying their applications vendors based on the savings their Web sites generate.

By Albert Pang

Research Manager, eCommerce Software

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Vol. 33, No. 16 IDC # 18265 January 19, 1999 Molly Upton, Editor

Predictions '99: The "Real" Internet Emerges

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The Internet is at the center of growth and change for the IT industry and for many businesses. In 1999, IDC predicts a fundamental shift in the Internet — from a skewed and strange environment to one that begins to look much more like the real world in key ways:

- One-third of U.S. homes will be online; half of these homes will buy products online.
- Women will become the online majority in the United States.
- The United States will become an online minority.
- Key IT markets will be shaped by the masses.
- Small businesses will flock to the Internet.
- Live phone support will become available in many Web stores.
- Web access will become available in many retail stores.
- Financial realities will drive Internet stock corrections.
- Competitive realities will drive many Internet mergers.

Succeeding in the exploding near-trillion-dollar Internet economy of the next four years requires adapting to this "new" Internet.

In the year in which we say goodbye to this millennium, we will also say goodbye to the Internet. The Internet will not actually disappear, of course. But it will be a decidedly different place by the end of 1999. The virtual world will cease to be a strange and skewed environment, distinct from the real world. The Internet will enter a new stage, one in which the virtual world looks a lot like the real world. In 1999, the real world will also continue to be reshaped by the virtual world.

This convergence of virtual and real worlds will challenge conventional strategies for success in the exploding Internet

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economy. In this issue, IDC forecasts the key trends, strategies, and events that will take place in and around the Internet, the shifts that will create new opportunities and risks, and the new winners and losers.

Internet User and Commerce Growth

Setting the stage for 1999's key shifts and trends will be rapid — and now routine — hypergrowth of Internet users and Internet commerce. IDC predicts the following for the coming year:

The number of Internet users will surge 28% to 147 million. This puts the Internet on the same population scale as major countries, surpassing Japan and nearing Russia in number. As we predict below, however, the demographic profile of this virtual nation is about to change significantly.

Internet commerce will more than double to $68 billion. For the first time ever, Internet commerce volume will exceed Bill Gates's personal wealth. Using another real-world yardstick, Internet commerce in 1999 will be on the same scale as the GDP of Ireland and Poland — but this virtual nation's economy is growing about 30 times faster than the global economy overall.

Looking ahead, IDC predicts that from 1999 through 2002, buyers will spend nearly $900 billion online. There's a lot of opportunity in the Internet economy, and the strategies for capturing that opportunity will shift in important ways. Businesses are advised to position themselves accordingly.

The New Internet User

The Internet's explosive growth means that two-thirds of those who will be online in 2002 aren't online right now. Understanding how the Internet user (and buyer) profile is shifting is a key to success in the Internet economy.

- Who will the new Internet user be? IDC predicts that in 1999, we'll see some fundamental shifts:
- John and Jane Doe will buy online. IDC predicts that by yearend 1999, one in three U.S. households will be online, and 50% of those households will buy online. The simple message to businesses that sell in the United States is that not having an Internet presence and an Internet commerce strategy is a recipe for share loss. In the U.S. market, starting in 1999, virtual is reality.

- Women will be the majority on the Net. In 1998, women jumped from 43% to 48% of the U.S. online population. IDC predicts that in 1999, women will break through the 50% mark. This is a very important shift in the Internet economy because the Internet until now has been skewed toward males. Success in the new Internet will require understanding the following ways in which women are different from men:

  — They seek out different Web destinations.

  — They spend less time surfing online.

  — And — oh, yeah — they are the primary decision makers in the majority of households' purchases.

- Most Internet users will live outside the United States. IDC predicts that in 1999, for the first time, the majority (51%) of Internet users will live in countries other than the United States. This prediction has major implications for the requirements for successful commerce sites.

Key Technologies for the New Internet User

- Lower-cost PCs, again. IDC made the first predictions for the $500–$1,000 PC in 1996. What happens now that Intel is on board the low-cost movement and companies like Compaq and Hewlett-Packard are determined to open up that end of the market? In 1999, look for a showdown around the low end of that range ($400–600) among the industry heavyweights. A dividend for the suppliers: IDC predicts that in 1999 suppliers have an excellent chance to finally penetrate 50% of U.S. homes.

- NetTVs will "arrive." IDC predicts that in the United States, NetTV deployments will heat up to numbers never before seen. We expect more than 3 million devices to be installed/activated in 1999, up from only 780,000 in 1998. This will be the year that everyone realizes how powerful cable companies really are, and the year that satellite providers prove that inter-activity is not limited to landline-based systems. Retail WebTV was nothing compared with what is about to happen. However, if these companies blow it — and this will probably be their last chance — competitors will seize the opportunity.

- Home networking will roll out. More than 15 million U.S. homes have two or more PCs, presenting a big market for products that can use existing wiring (phone, cable, power) or wireless technology to connect PCs to peripherals, public networks, and each other.

The New Internet Business

As the Internet crosses key demographic thresholds, it will also change as a business environment. IDC predicts that in 1999, the world of business on the Internet will see the following changes:

- Small businesses will take off as a key online business community. IDC predicts that one in eight U.S. small businesses will have a Web site by yearend, reaching 20–25% by 2002.

- Reaching international customers becomes a critical success factor for Internet businesses. We predicted the demographic shift earlier. Two-thirds of leading U.S. Web sellers have already made some steps to reach out to non-U.S. customers; almost 30% support more than one language.

- Calculating "lifetime value (LTV) of customers" will be a key trend for valuing commerce sites and companies. One of the ways in which the virtual world will converge with reality in 1999

will be in a growing demand for rational ways to measure the value of online sites (including pure-play Internet companies). Today, just over 40% of the leading Web sites surveyed by IDC attempt to measure LTVs, and many do so informally.

Technology Trends for the New Internet Business

- Personalization/customization will be the "ante" for successful commerce sites. Why? Because it works. IDC research indicates that users who have personalized a site visit with a frequency two to four times that of users who have not. Not surprisingly, IDC research also shows that more than 60% of leading Web commerce sites already have some form of personalization in place. In 1999, the mainstream will join the trend.

- "Personal merchandising" redefines commerce sites. In 1999, IDC predicts a trend toward "personal merchandising" — the ability for a site to create a unique view of an online store, featuring offerings targeted by customer profile. This trend represents a big step beyond targeted banner advertising. The payback? Targeted offerings can increase yields by an order of magnitude.

- Integration of virtual and real sales and support. Leaders will voice-enable their Web sites, and brick-and-mortar retailers will introduce Internet kiosks into their stores. Why? Customers want the best of both worlds. Internet shoppers want live sales assistance and customer support. And in-store shoppers want the information resources of the Internet.

Key Internet Market Developments in 1999

- **Internet stock correction.** As in the early 1980s when the PC market was born, there are some great long-term winners out there. And then there are the rest. The trouble is that they're all getting very high valuations. Don't expect it to last for long.

- **Internet consolidation.** Deflated valuations, growing cash needs, intensifying competition, the need for critical mass, and a possible recession will drive two trends: (1) acquisitions of Internet pure-plays by Internet-challenged "real-world" media, financial services firms, and retail giants; and (2) mergers among Internet pure-plays. Some deals we could see in 1999 are the following:
  - **E*Trade acquires and is acquired.** A good bet is that E*Trade will gobble up a smaller online broker like Ameritrade or Datek. But we think E*Trade itself will be a takeover target, to bolster the Net presence for a global financial services giant. Wells Fargo and Citicorp are candidates. If so, scratch the Ameritrade or Datek deal.
  - **CDnow/N2K is acquired.** They've merged. They're still not big enough or financially strong enough but would be a good Internet expertise buy for real-world retailers such as Barnes & Noble, Borders, or Wal-Mart.
  - **Microsoft buys a real portal.** AOL has raised the stakes. And MSN's management shakeup isn't enough. Microsoft must see — and raise — AOL's bet by grabbing Excite or, if it gets more ambitious, Yahoo! as well. With Microsoft's NBC partnership, CNET/Snap makes some sense, but Microsoft needs more than Snap to crackle in this space.
  - **Yahoo! merges with media giant.** Barring a Microsoft purchase, Yahoo! needs to position itself for the next great media war. Partnering with a real-world media company is the next step — if it can find one that won't screw it up. Time Warner, CBS, and News Corp. are candidates. Other possible suitors from the network services world, moving upstream, are TCI and AT&T.

— **Lycos and Excite will find partners.** After the AOL/Netscape merger, Lycos and Excite find themselves even more threatened by Goliaths. They also face a year of high expectations from Wall Street. Two likely directions: merge with one another to gain eyeballs and cut costs or partner with a major media partner with deep pockets. A merger of either company with Infoseek (and the Disney connection) could accomplish both.

— **NBC buys more of CNET and Snap.** That's an easy pick. A longer shot, but quite possible, is that NBC may shop around for more, taking part in some of the deals predicted above.

— **Compaq sells off AltaVista.** AltaVista is a key "eyeballs" site, and it's nonstrategic to Compaq (although Compaq may not know it yet). Yahoo! would make a good buyer; if not, then AOL or NBC/Snap/CNET.

— **Ziff Davis spins off ZDnet in an IPO.** An Internet company roughly the size of CNET is trapped inside a magazine company. Think of all those Internet IPO dollars. But Ziff Davis had better hurry.

— **AOL and Microsoft versus the U.S. Department of Justice (DOJ).** The two owners (Microsoft and AOL) of three of the top four Internet traffic sites now each own one of the top two browsers. That's a lot of market power. As ugly as the idea seems, DOJ may be tempted to intervene.

— **Microsoft versus DOJ.** Which will come first: DOJ breaks up Microsoft or Microsoft rearchitects itself in response to stumbles in a changing market? As predicted in Directions, '98 last March, we'll go with the latter. Chance of neither happening? Zero.

— **The availability of adult sites to minors rekindles the Internet censorship issue.** Almost 20% of visitors to adult entertainment sites are aged 12–17. That's a high enough number to kick off another round of Net censorship wars in Washington.

— **Presidential race threatens the Internet.** As candidates gear up for the presidential run in 2000, many of them will attempt to claim credit for the growth of the Internet and Internet commerce. To support their claims, many will file bills related to Internet privacy, censorship, taxation, and so on that threaten the growth of the online marketplace.

At Long Last, Y2K

This issue just wouldn't be complete without this last chance to predict how the Y2K crisis will actually play out.

With the climax of the "year 2000 show" a little less than 12 months away, IDC Y2K analysts predict that the disruptions from Y2K will be fairly modest.

IDC estimates that only 0.2% of Y2K bugs will cause business-critical problems and that the majority of crashed systems will take hours to days to fix. And fortunately, January 1, 2000 falls on a Saturday. We also predict that Y2K pundits will rapidly discover numerous other computer-programming-related crises.

— Frank Gens, Sr. VP, Internet Research

(Editor's Note: Excite is being acquired by @Home. Compaq is planning Alta Vista's IPO. Ziff did indeed hurry and is spinning off Zdnet in an IPO. Lycos found a partner in USA Networks.)

THE EURO AND THE INTERNET — A DYNAMIC DUO

The U.S. will become an online minority. How did the United States get knocked from its self-absorbed perch so soon? The faster growing regions are Europe, Asia Pacific, and the rest of the world.

IDC's Internet Commerce Market Model published in 1998 projects the U.S. portion of World Wide Web users will drop from 56% in 1997 to 48% in 1999 to a sobering 42% by 2002 (see Figure 1 and *The Global Market Forecast for Internet Usage and Commerce*, IDC #16569, July 1998.).

Although English is still an important language in commerce, the key word for Web sites is internationalization — which means offering users a choice of language at the site and/or translation capabilities, as well as online currency conversion.

EURO IMPACT

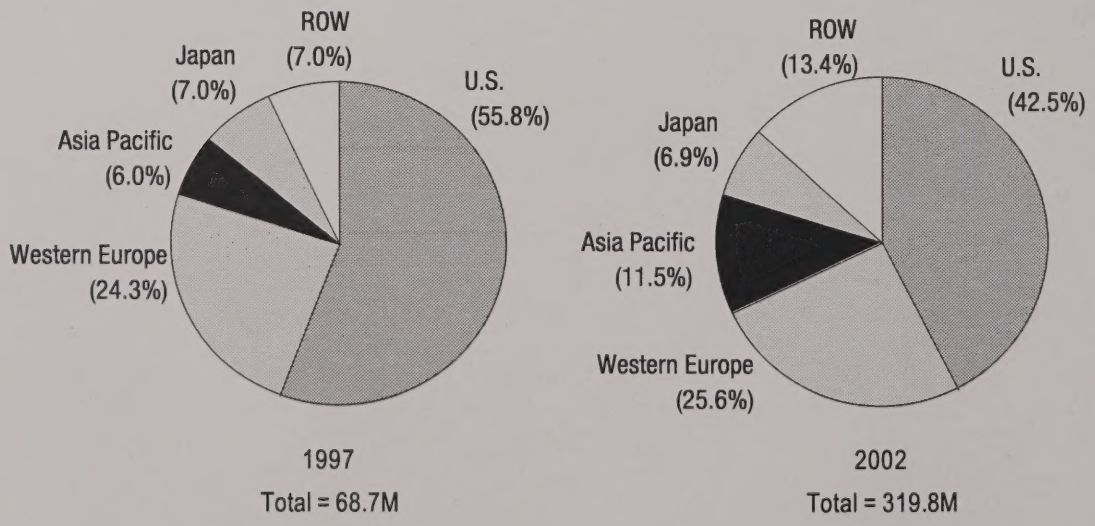
Although the advent of the euro will not be fully felt at the consumer level until 2002, it will start to have immediate impact on corporate e-commerce.

The implications of the euro are going to be immense, not only in Europe, but worldwide. In a propitious confluence of events and technology, the advent of the euro and the Internet will symbiotically fuel each other's significance.

Internet commerce in Europe will be facilitated by a common currency that measures the cost of goods regardless of the country in which transactions occur.

The euro will help soften the national barriers, and the Internet will extend the reach of buyers and sellers. Both the euro and the Internet will facilitate transactions and reduce costs. Consequently, e-commerce will become a competitive necessity in Europe as well as the United States.

FIGURE 1
WORLD WIDE WEB USERS BY REGION, 1997 AND 2002



Source: International Data Corporation, 1999

In 2002, when the euro currency reaches the general population, consumers as well as businesses are likely to regard buying and selling on the Internet as acceptable as — if not more so than— U.S. residents do. In fact, the combination of the euro and the Internet could release pent-up demand by consumers for goods from other nations.

Western Europeans are already adept at using the Web and buying over the Web. With a base of more than 22 million World Wide Web users at yearend 1998, E-commerce revenues were nearly $3 billion — more than triple the amount in 1997, according to IDC's European Internet Program. Note that IDC figures are for 13 West European countries, while the euro has 11 members.

The significance of 11 nations adopting a single currency cannot be overemphasized. Combined, the Economic and Monetary Union (EMU) resembles the United States. in population and size of GDP. According to figures in the Wall Street Journal, the populations of the United States. and the euro 11 are 286 and 292 million, respectively, while the GDPs in 1997 were $8.11 and $6.26 trillion, respectively.

The changes that will ripple through Europe have the potential to drive an economic engine as the various pistons work in synch. Meanwhile, the United States is blissfully ignoring the emergence of another reference currency.

The telephone companies — the lifelines between nations — will be an interesting indicator of how rapidly counties can shed their parochial PTT skins and capitalize on the Internet frenzy. Shortly after the euro was launched, the value of telecom stocks started to ascend, in a sign that investors have recognized the growth potential for the market.

Kudos to the Programmers

Kudos to all the folks who toiled over New Year's weekend to convert all the programs within the trading community from native currencies to the euro. The hotels hosting the round-the-clock crews were asked to remove alcohol from the minibars in order to ensure long work hours with peak output. Now these lucky people get to work on Y2K.

Spending Driver

Already the Internet has become an economic factor in Europe, according to a recent IDC report (*Internet Markets in Western Europe: Review and Forecast, 1997–2002,* IDC #104E, December 1998). In addition to driving investments relating to Internet access, the Internet will also drive traditional IT investments such as hardware, software and services.

Internet-driven spending in Western Europe in 1998 was nearly US$19 billion, and will top a whopping US$51 billion in 2002. Items included in the spending are software, servers, services, information appliances, PCs, network equipment, and Internet access.

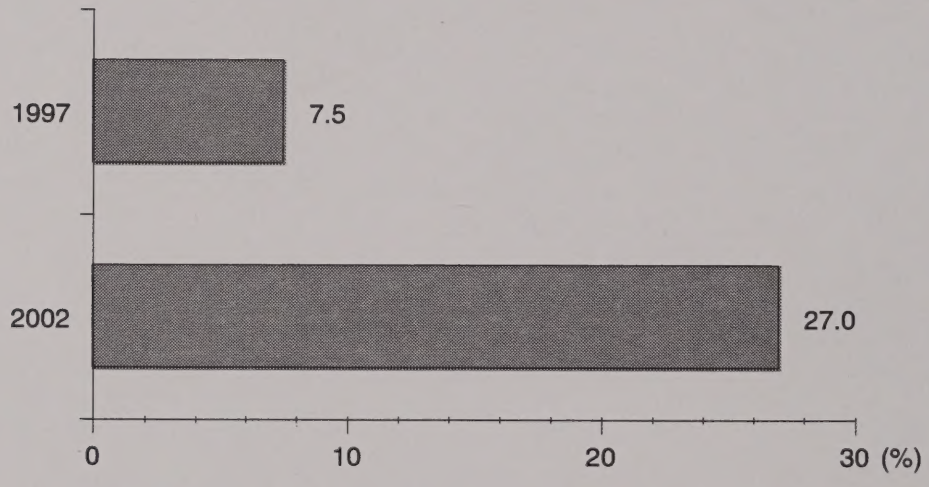
Revenues for Internet access, for example, are expected to grow at a compound annual rate of 33% between 1997 and 2002 when they will exceed US$8 billion. As in the United States, the telcos are battling with the ISPs to win and retain the hearts and minds of their customers.

Applications software is one of the larger sectors that will be driven by the rise of the Internet in Europe. As the Internet forces companies to rethink their businesses and value propositions to customers, IDC expects companies to increase their spending on applications software. For example,

IDC estimates Western European applications software revenues driven by the Internet will rise from US$2.4 billion in 1997 to US$9 billion in 2002, from about 12% of the market to 25% in the same period (see Figure 2 and *Internet Markets in Western Europe: Review and Forecast, 1997–2002* , IDC #104E, December 1998).

Despite the potentially unifying impact of the euro, Europe is far from homogenous in key factors such as PC penetration and lure of the Internet. Some corporations in Nordic countries and the Netherlands have been providing home PCs for their employees to promote familiarity and skill. For example, IDC believes the Internet will drive nearly one-quarter of PC sales in Sweden, but only 10% in Spain. In Southern Europe, PC penetration is not as deep.

FIGURE 2
INTERNET-DRIVEN WESTERN EUROPEAN APPLICATIONS SOFTWARE AS % OF TOTAL MARKET, 1997–2002



Source: International Data Corporation, 1999

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Web Hosting — The Time Has Come

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November 15, 1998
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Vol. 33, No.15

The holiday '98 crunch may prove to be the crucible that prompts even more Web sites to outsource their Web functions. Already, Web hosting is growing at a sizzling pace.

Worldwide revenues of U.S.-based Web hosting providers are forecast to nearly double in each year until 2002, growing from $414 million in 1997 to nearly $12 billion for a phenomenal compound growth rate of 95.5%.

Times are changing. The movement toward Web hosting is turning old axioms on their heads. Once the prevailing wisdom was that it was OK to outsource mundane applications such as payroll. Now, however, Web hosting is blazing a path because the applications, especially those in eCommerce, are mission-critical and need rapid application of skilled firepower to do the following:

- Gain leadership status in the new competitive commerce arena
- Leverage the Internet to maximize business processes and increase profit margins

Web hosting and the related field of application outsourcing bear remarkable resemblance to service bureaus. Remember them? Although the industry is reluctant to resurrect the term, the fact is Web and applications hosting are service bureaus in '90s clothing.

Outsourcing, especially Web hosting, is reemerging as a key strategic tool. eCommerce appears as one of the leading-edge applications through each of the relevant markets.

DRIVERS

Some of the key drivers of the Web hosting trend include:

- eCommerce and its needs for rapid scaling and failure-proof performance (Think of the holiday '98 crunch.)
- Public face: The recognition that a firm's Web presence is a critical element of how it is perceived by the public (And first impressions count — a lot.)
- Rapid pace of technological improvements and the competitive need to capitalize on them
- Performance:
  - The pursuit of bandwidth by being near a network access point
  - Sophisticated techniques such as load leveling, etc.
- The need for expertise that stays current

There are also the usual motives for outsourcing, such as focusing in-house staff on existing projects and leveraging economies of scale available to the hosting company.

Similarly, on the supply side, Internet service providers (ISPs) are

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facing consolidation and are looking for value-add services. The application service providers, another category of player, want to create a more level revenue stream through usage fees and are linking up with telecommunications firms, ISPs, and others.

HOT MARKET

The Web hosting market is ablaze. International revenues for U.S.-based providers are expected to zoom from $414 million in 1997, and an estimated $770 million in 1998, to $11.8 billion in 2002 (see Figure 1)

The annual growth rates are expected to accelerate after companies have completed their Y2K efforts and can apply more of their budgets to Web hosting. The forecast assumes that Web hosting services will continue to integrate Web hosting solutions with existing business processes, thus yielding opportunities for additional revenues from systems integration work.

In calculating Web hosting market revenues, IDC excluded Internet network revenues such as those garnered by ISPs for offering dial-up Internet access. IDC's report *Web Hosting and eCommerce Service Providers* (#16894, October 1998) details the market as well as its key players Some of the key growth drivers in the Web hosting market are:

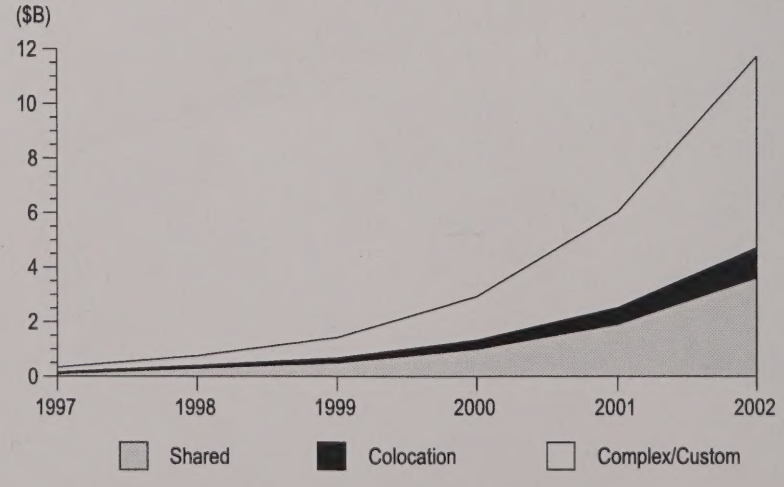
- eCommerce (both business-to-consumer and business -to-business)
- Corporate intranets
- Web marketing sites

DEDICATED AND SHARED SERVICES

The Web hosting market consists of two different types of services, shared and dedicated, with the latter being the larger segment and growing at a more rapid rate.

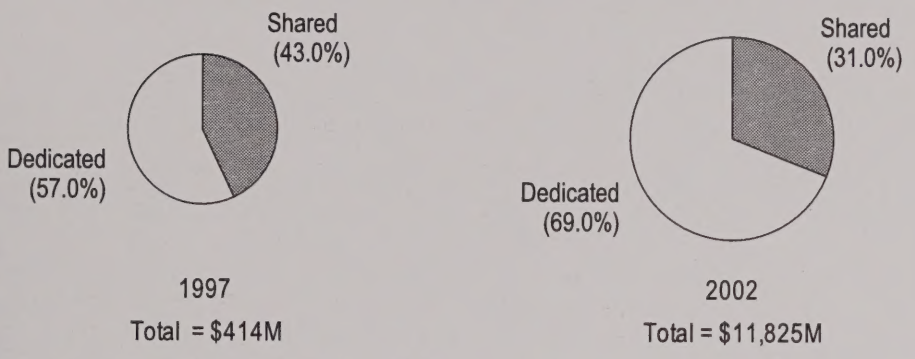
The shared service consists of customers sharing hosting facilities such as servers, while the dedicated service offers customers their own servers.

FIGURE 1
WEB HOSTING WORLDWIDE REVENUES OF U.S.-BASED PROVIDERS, 1997– 2002 ($B)



Source: International Data Corporation, 1998

FIGURE 2
WEB HOSTING WORLDWIDE REVENUES OF U.S.-BASED PROVIDERS, 1997-2002; DEDICATED OUTPACES SHARED HOSTING REVENUES



Source: International Data Corporation, 1998

The dedicated portion of the market consists of two subsectors: colocation and complex/custom.

The shared service sector will grow at a compound annual growth rate (CAGR) of 83.2% between 1997 and 2002. Smaller companies that have Web sites for marketing purposes are often customers of shared services. These sites rarely graduate to dedicated service, which tends to be used by sites that interact with customers and/or suppliers.

Given the demands for ensured performance, the hottest part of the market is for dedicated systems, which offer customers their own servers. Dedicated systems already hold the major share of revenues with 57%, and they will represent 69% of the Web hosting market by 2002, with a CAGR of 103%. (see Figure 2).

By 2002, revenues for dedicated Web hosting should reach $8.17 billion, while shared Web hosting, at $3.65 billion, will be less than one-third of the total.

Within the dedicated portion of the market, the colocation category consists of firms that place their own servers at the site of the Web service providers, usually to take advantage of better bandwidth that may be offered by proximity to network access points. Customers' own personnel administer the servers and the Web sites.

The complex dedicated hosting market segment is product-oriented; the custom hosting market segment is more service-oriented and is designed to offer individualized sites for the clients that are also linked to key business systems.

The Web hosting provider has opportunities to offer systems integration in each type of Web hosting implementation. For example, IBM Global Services is finding that after customers have mastered simple sites and "brochure ware," the next level of business value involves reengineering business processes.

PLAYERS

As with any emerging market, there is no dearth of players in the Web hosting arena. However, in 1997 a sizable chunk (40+%) of the market was in the hands of the three largest players — IBM Global Services, AT&T WorldNet, and WorldCom Advanced Networks.

The players come from a myriad of backgrounds. The roster includes

- Platform providers such as IBM
- VARs and systems integrators such as EDS et al.
- Application service providers such as Sterling and Open Market
- Network service providers such as AT&T, Worldcom Advanced Networks, and GTE
- ISPs such as Digex, Exodus, Navisite Internet Services, Hiway Technologies, and Mindspring Enterprises

WHO'S BUYING?

Web hosting customers include the following:

Digex — U.S. Postal Service, U.S. Navy Intranet, Martha Stewart, Japan Airlines, J. Crew, Nike, Anheuser-Busch, TWA, Forbes

IBM Global Services — Merrill Lynch, Smith Barney, Goodyear's dealer extranet, Candle Corp. (the candle maker)

Epoch — Motorola, Reuters, Hughes, Virgin Interactive Entertainment, Mirage Resorts and Hotels, the American Red Cross, C-SPAN

Web Sellers Outsource

As part of IDC's report *Web Sellers Speak: Learning from the Leaders* (IDC #17973, January 1999), IDC interviewed companies judged to be leaders in eCommerce. Nearly half (44) of the 100 online commerce companies interviewed are using outside Web hosting services. These statistics are not projectable, but they certainly are indicative of the impetus eCommerce provides for Web hosting.

Performance or bandwidth (64%), support and availability (50%), and cost (50%), were the three most frequently mentioned reasons for using a Web hosting service (see Figure 3).

Applications Vendors Want In

Among the species of players entering the market is what IDC calls the application service provider (ASP) — essentially, a software firm linking with third parties such as outsourcing firms, telecommunications companies, and ISPs to provide remote access to its applications and broaden its base to smaller customers.

Here as elsewhere, eCommerce is one of the leading applications. Some players are more aggressively pursuing this market than others. For instance, Open Market has licensed its Transact software to about 30 firms through its Commerce Server Provider program. Transact software performs order management for Internet commerce.

Among Web hosting players offering eCommerce software from third-party providers: AT&T (providing software from Open Market and Order Trust), Internet Commerce Services or ICOMS (providing software from Open Market), and U.S.internetworking (providing software from Broadvision and Netscape).

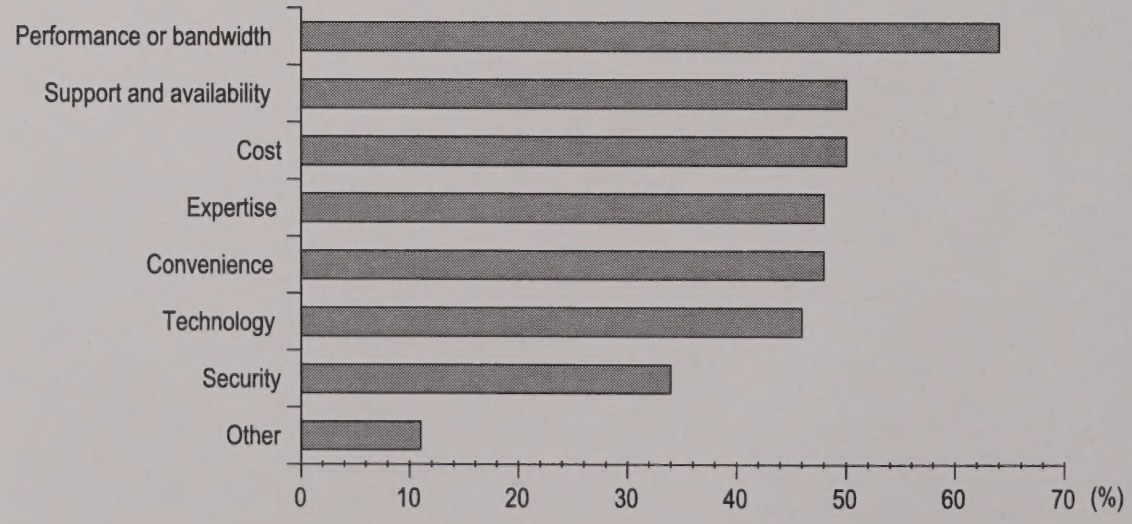
IBM Global Services is busy lining up a range of software to provide services in both eCommerce and ERP. IBM has been surprised at the number of large eCommerce sites for which it provides hosting. These sites have recognized the need to satisfy the unpredictable demand for increased capacity.

IBM Global Services has said its Web hosting revenues are growing in the triple digits. Many of its large retailing customers saw sales jump by 300% or more in 1998 compared with 1997.

By adding the ASP channel with usage fees, software firms are hoping to access a more predictable revenue stream.

Clare Gillan, IDC Vice President, Applications and Information Access, observed,

Figure 3
eCommerce Sites' Reasons for Using Web Hosting Service



(% Mentions — Multiple Responses)

Source: International Data Corporation, 1998

"Ultimately, ASPs have the potential to change the structure of the packaged application industry as we know it today." IDC reports on application service providers provide more detail (see *The Emerging Application Service Provider — Definition, Vendor Initiatives, and Developing Trends,* #L22E, July 1998, and *The Emerging ASP: A Look Inside the Business Model,* #17228, September 1998).

Applications Preferences

IDC asked its Technology Integration Panel study members to indicate the strength of their preferences for running certain applications internally or externally. On a 5-point scale, with 5 being "definitely prefer to run the application externally," payroll was the clear leader (26%) among definite preferences for external hosting (see Figure 4).

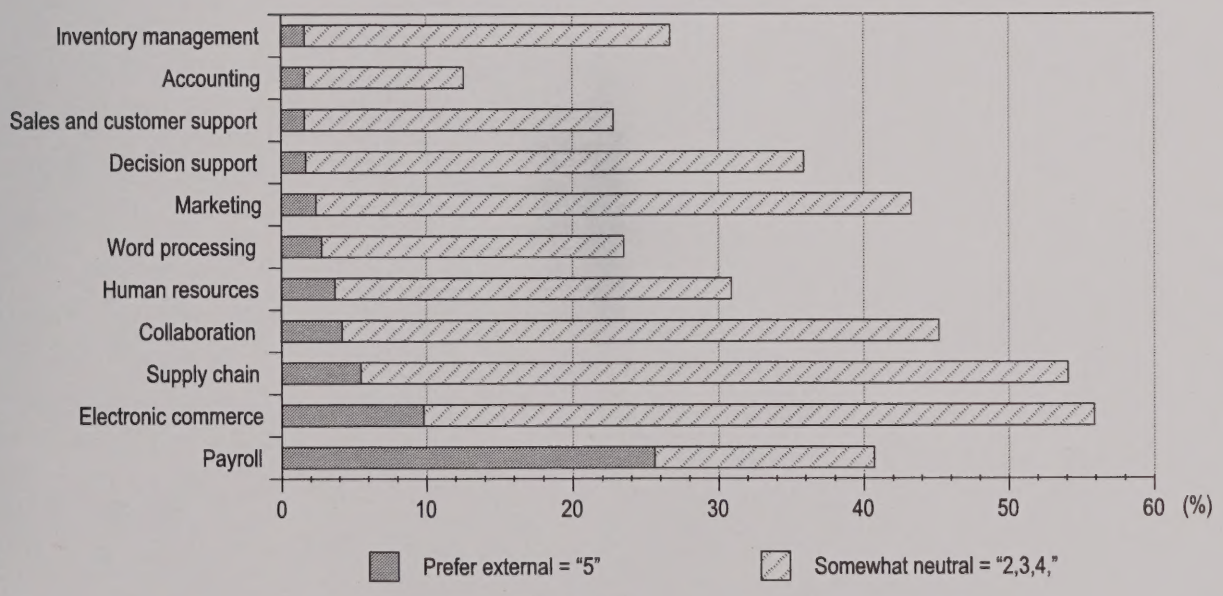
More interesting is the panel members' ambivalence about eCommerce and supply chain, indicating these are definite outsourcing candidates. Figure 4, taken from *The Emerging Application Service Provider: Will a New Generation of Application Outsourcing Prevail?,* IDC #16329, June 1998, shows the responses of those indicating a "5" as "definitely prefer external" and those responding with "2, 3, 4" as "somewhat neutral."

Motives and Concerns

Some interesting differences in attitudes on outsourcing between the active eCommerce sites and the general IS population are illustrated through the results of IDC's Technology Integration Panel study.

In examining IS attitudes toward service bureaus for business applications other than payroll,

Figure 4
IS Preferences for Running Applications Externally
(On a 5-Point Scale)



1 = Definitely prefer internally;
2 = Somewhat prefer internally;
3 = Have no preference;
4 = Somewhat prefer externally,
5 = Definitely prefer externally.

N = 750

Source: IDC's *Technology Integration Panel Study*, December, 1997

CHRISTMAS CRUCIBLE

If any retailer doubted the need for scalability before the 1998 holiday season, chances are that its Web business crashed and burned. Customers do not take kindly to super-slow sites, and some sites simply crumpled under the pressure of too many hits during the holiday season.

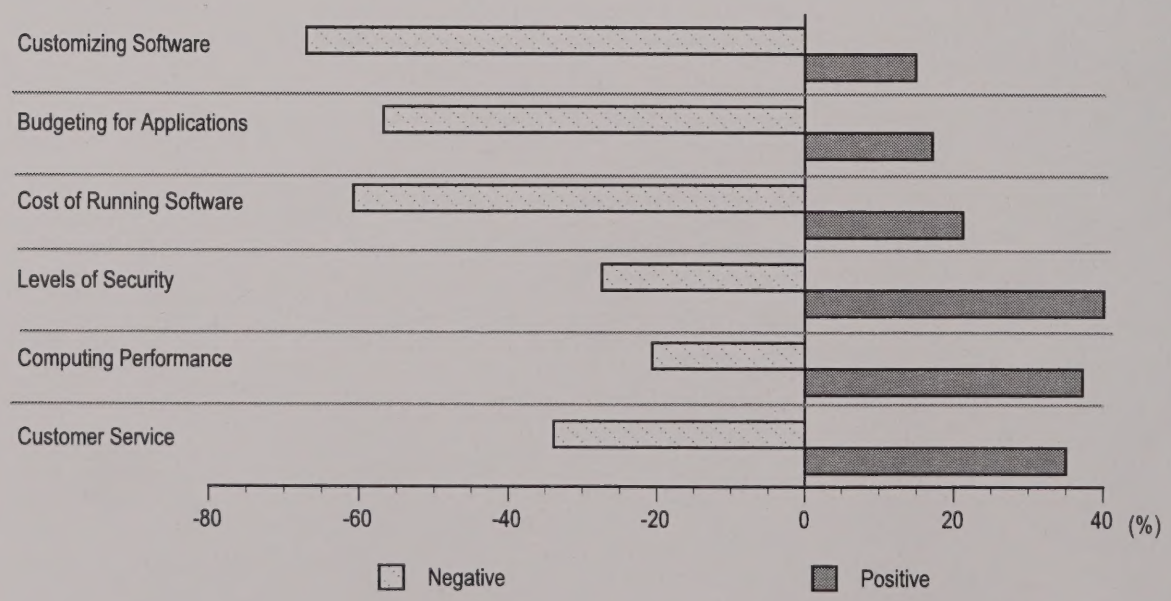
Ssites reported to have been a mite under the weather at some point during the shopping season include Barnesandnoble.com, eBay, Art.com, and 800.com. Retail sites count themselves lucky or perspicacious if their sites did not go down during the online rush.

And a well-designed, fast-to-navigate site begets more business. Seductive is the only way to describe Amazon.com's site. It garnered more than 80% of this editor's holiday spending.

Of course, taking orders is only the first challenge. One of the questions is whether these retailers were able to fulfill and deliver in time to make customers truly happy. Before the 1998 holiday season and its eCommerce volume, the delivery services' pricing schemes relied on certain ratios of deliveries to businesses (multiple packages) to offset the cost of delivering a single package to a residence. Doubtless the deluged delivery services are now evaluating whether to institute separate pricing schemes for delivery to consumers.

Post-holiday business could prompt several retailers to realize they may need to provide gift recipients competent customer service phone staff to handle gift exchanges as well as to assist with sales. The integration of the Web with call centers is likely to be the next feature that top Web hosting sites need to provide.

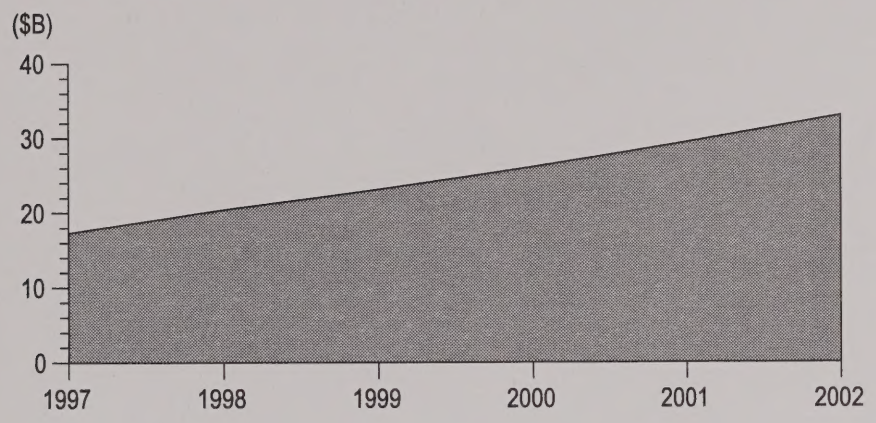
FIGURE 5
IS ATTITUDES TOWARD SERVICE BUREAUS FOR BUSINESS APPLICATIONS OTHER THAN PAYROLL (% RESPONSES)



N = 750

Source: International Data Corporation, 1998

FIGURE 6
U.S. IS OUTSOURCING REVENUES, 1997-2002 ($B)



Source: International Data Corporation, 1998

the most clear-cut positive reasons for outsourcing are computing performance and levels of security (see Figure 5). Payroll was excluded from the study because it is by far the most popular candidate for outsourcing.

Technology Integration Panel members were asked to rank, on a 1-5 scale from extremely negative to extremely positive, different aspects of outsourcing. Figure 5 depicts the percent of respondents answering either 1 or 2 as negative and 4 or 5 as positive.

Interestingly, among the IS group, customer service received nearly equal mentions as both negative and positive aspects of outsourcing.

TWO VIEWS OF COST

Cost is clearly a concern for a majority of IS respondents considering outsourcing. The two categories of "cost of running software" and "budgeting for applications" received more than twice as many negative ratings as they did positive ratings.

However, the eCommerce sites interviewed for *Web Sellers Speak* had different opinions. Half the eCommerce sites that use Web hosting services mentioned cost as one of several reasons they chose to outsource.

Clearly, the major reasons for using Web hosting services are performance or bandwidth, support and availability, and cost, as cited in multiple responses by sites using Web hosting services (refer back to Figure 3).

IS OUTSOURCING

A somewhat related market, IS outsourcing, is defined by IDC as occurring when a company outsources a large part of its IS operations to a third party. The services rendered can include items such as data center, client/server, network, desktop, applications, and help desk.

The growth rates for the U.S. IS outsourcing market are much slower than those for Web hosting — perhaps a reflection of the much larger base. U.S. IS outsourcing revenues will nearly double between 1997 and 2002, from $17.3 billion to $33 billion, with a CAGR of 13.8% (see Figure 6). That is a very respectable growth rate considering the size of the base. More details can be found in *Outsourcing Markets and Trends in the United States and Worldwide, 1995-2002,* IDC #17261, November 1998.

Examining IS outsourcing spending by industry, banking, manufacturing, and government are and will continue to be the three biggest spenders (see Figure 7).

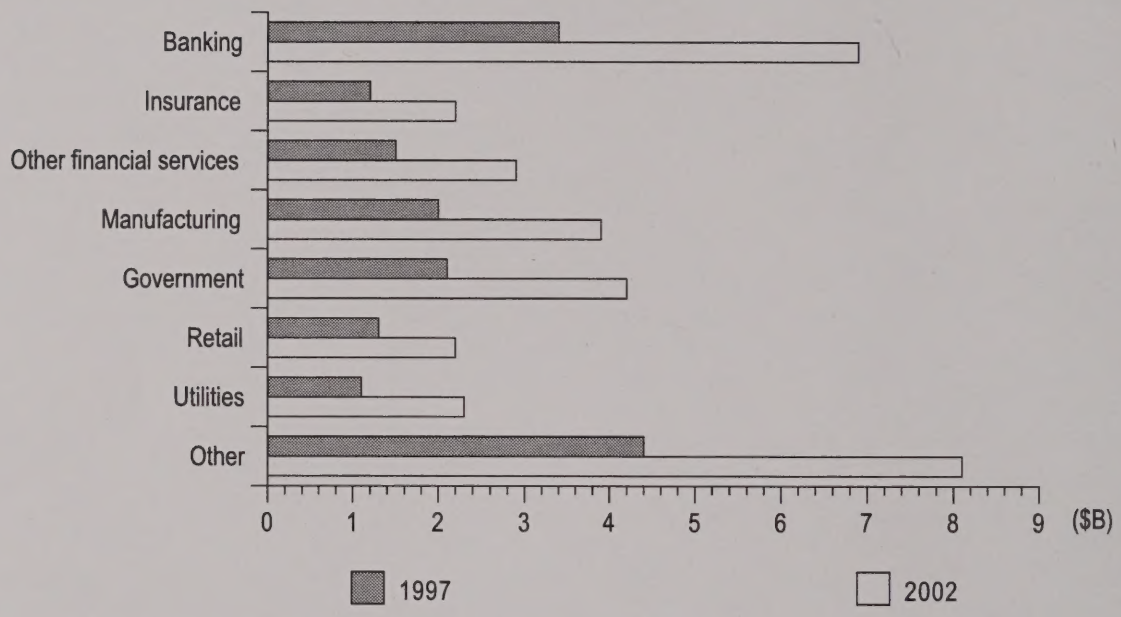
The combined projected spending in 2002 of the members of the financial sector (banking, insurance, and other financial services), represents nearly 37% of the all spending for U.S. IS outsourcing. Jesse James' adage is alive and well.

Interestingly, outsourcing increasingly will be adopted by medium-sized and large firms in an effort to gain access to sophisticated tools (see Figure 8).

The adoption of IS outsourcing by small and midsize firms may reflect the Internet's effective leveling of the playing field. As eCommerce spurs companies' growth, they may decide to outsource their entire IS operation along with their eCommerce business.

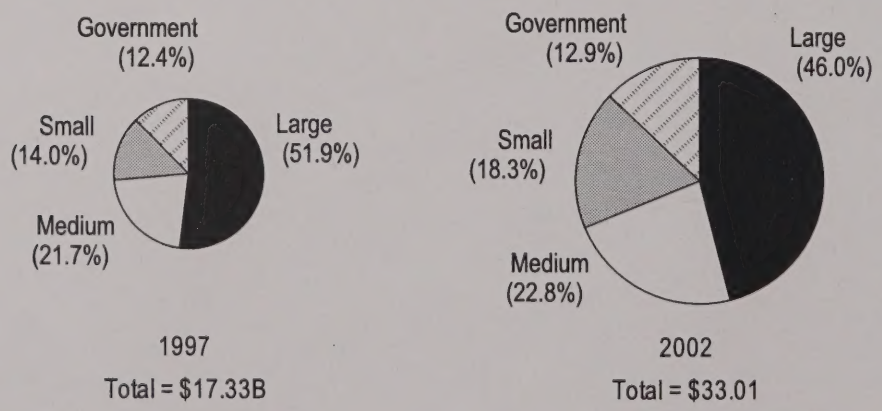
Look for eCommerce to continue to be among the leading applications that prompt corporations to consider outsourcing. eCommerce could prove to be the proverbial camel's nose under the tent, leading to traditional systems integration and business reengineering and/or outsourcing of additional applications. In the next decade, "out" could be in.

FIGURE 7
U.S. IS OUTSOURCING SPENDING BY SELECTED INDUSTRY, 1997 AND 2002 ($B)



Note: Manufacturing includes both discrete and process
Source: International Data Corporation, 1998

FIGURE 8
U.S. IS OUTSOURCING SPENDING BY COMPANY SIZE, 1997 AND 2002 (%)



Source: International Data Corporation, 1998

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Think Vertical

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November 1, 1998
IDC # 18138
Vol. 33, No.14

The Internet world is engaged in merger mania, one of the necessary steps toward industry maturity. The two driving forces at this stage are the following:

- Vertical expansion by adding complementary products and services.
- Audience aggregation – eyeballs are assets, and eyeballs that are "hardwired" or persistent between a browser and a portal are valued in gold because the users visit the portal repeatedly, if involuntarily.

The proposed acquisition of Netscape by America Online (AOL) would accomplish both objectives.

The hardware server companies and the online community conduct different forms of vertical merger dances.

Beleaguered e-commerce managers are demanding one-stop shopping, or at least one-stop reference selling, because they do not have time or staff to winnow through 25 different proposals and glue together disparate pieces.

In order to satisfy customer demands, hardware vendors are scrambling to present a complete stable of products that include elements from each of the following areas:

- Servers
- Software
- Service

PARTNERING

Many of the server companies have been gathering a stable of e-commerce-related offerings via partnering. The pace resembles the frenzy of musical chairs.

In one week, *The Gray Sheet* has been deluged with announcements.

Hewlett-Packard has been taking the partnering approach to gathering much of its stable of e-commerce-related offerings; it recently announced a foray into customer relationship management for financial firms through alliances with Action Systems Inc., Broadvision, Fair, Isaac, Oracle, and Prime Response. Emphasizing the importance of a services arm, HP Consulting will provide consulting and integration services for these companies' products.

Not to be outdone, IBM added applications for personalization, merchandising, customer service, payments, enterprise resource planning (ERP), and supply chain management. The vendors

THE GRAY SHEET

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joining Big Blue's circle include Assist CornerStone Technologies, CyberCash, CyberSource, Datasul, e2 Software Corp., EuroSoft, Information Builders Inc., Ironside Technologies, Magic Consulting Australia, Netcentives, net.Genesis Corp., Paciolan, PaylinX, Seagate Software, Simware, SNS/Assure Corp., United Parcel Services (UPS), and VideoServer.

Online players have their own version of vertical expansion, and are attempting to secure control of a larger portion of the food chain that includes elements such as the following:

- Browser
- Portal
- E-commerce
- Physical infrastructure (e.g., warehousing to support e-commerce).

For example, in a classic attempt at checkmate, Barnes and Noble, after receiving $200 million from media publisher Bertelsmann AG for a one-half interest in its online venture, announced that it is buying all of Ingram Books, whose warehouses supply a majority of books to arch rival Amazon.com. (Interestingly, in Europe, Bertelsmann AG has a joint venture with AOL, called AOL Bertelsmann.)

AOL/Netscape: Eyeballs, Commerce, and Java

The proposed AOL/Netscape deal at first blush appears to be motivated by eyeball aggregation. But it also has implications for the following:

- A trend toward multiple brand/product aggregation among browser providers
- E-commerce, especially in the consumer and small business arenas
- Java propagation

Locked Eyeballs?

The lock on portals via browsers delivered with Microsoft's operating system was controversial. Now the question is whether AOL's proposed ownership of two "hardwired" or "persistent" portals will raise any industry hackles.

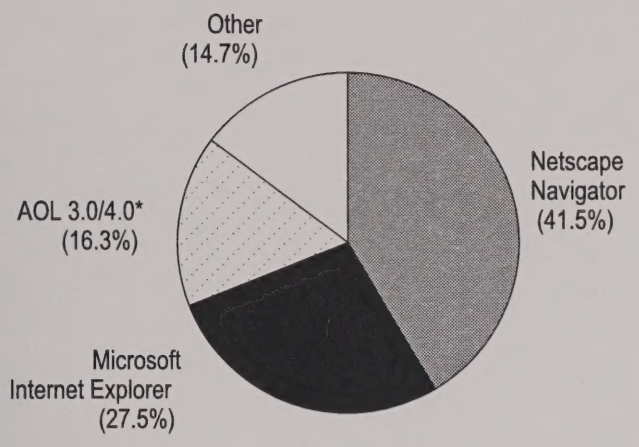
With purported installed bases of 24.6 million and 9.6 million users, respectively, Navigator NetCenter and AOL together reach 58% of the Internet audience, IDC estimates (see Figure 1). However, the data in Figure 1 can be construed different ways. For example, because AOL's versions 3.0 and 4.0 have Microsoft IE integrated as their Web browser, one can consider them as a combined entity, which with 43.8% of the market surpasses Netscape Navigator's share.

The installed base is determined by what users identify as any browser they may have installed; market share is based on what users define as their primary Web browser. (*U.S. WWW Browser Market Share and Forecast Tracking, Midyear 1998* IDC #17098, September, 1998).

There are two different types of portals:

- "Hardwired" or persistent — Sites to which one is directed by the system/browser (e.g., AOL, Netscape's NetCenter, Microsoft's MSN).
- Optional — Sites the user voluntarily visits frequently, because they offer links to other final destinations (e.g., Yahoo, Altavista, Lycos, Excite).

FIGURE 1
U.S. OVERALL INSTALLED BASE BROWSER SHARE, MIDYEAR 1998 (%)



Total Browsers Installed = $59.3M

N = 1,084

* AOL's versions 3.0/4.0 have Microsoft Internet Explorer integrated as their Web browser

Source: International Data Corporation, 1998

Depending upon the licensing terms of the browser provider, other sources of hardwired portals may include the following:

- PC vendors that preconfigure the browser to their sites
- Internet service providers (ISPs) that preconfigure the browser to their sites (e.g., MediaOne)
- Corporate IT departments that preconfigure the browser to their own home pages (e.g., IDC)

PORTAL POWER

The power of persistent portals may continue to prove itself in the future. IDC projects that within five years, two-thirds of Internet users will have joined the 'Net since 1998.

How do new users find out about optional portals such as Lycos, Excite, and Yahoo? Will a persistent platform (e.g., Netscape/AOL browser) control user navigation?

With the proposed combination of AOL and NetCenter, other portals may be scrambling to partner to acquire added volume.

The combination of AOL and NetCenter will command 35% of the online advertising revenue, or about $450 million. Nice chunk of change. Yahoo! is behind with $200 million, according to IDC data.

MULTIPLE BRANDS

Netscape's NetCenter brings its business user base into the AOL fold, thereby extending AOL's reach (see Figure 2). The NetCenter name likely will continue because each portal has distinct user populations as well as different revenue-sharing agreements with other partners.

The trend toward multiple brands and portal consolidation means the turf is being taken over by the larger players.

Look at all of AOL's brands: AOL, Netscape/NetCenter, CompuServe, DigitalCity, ICQ, and InstantMessenger. Other strong players with multiple hooks in the market include Disney/Infoseek, Microsoft/MSN, and the Lycos Network (Lycos, Tripod, WhoWhere?, Angelfire, Hotbot, Wired Digital).

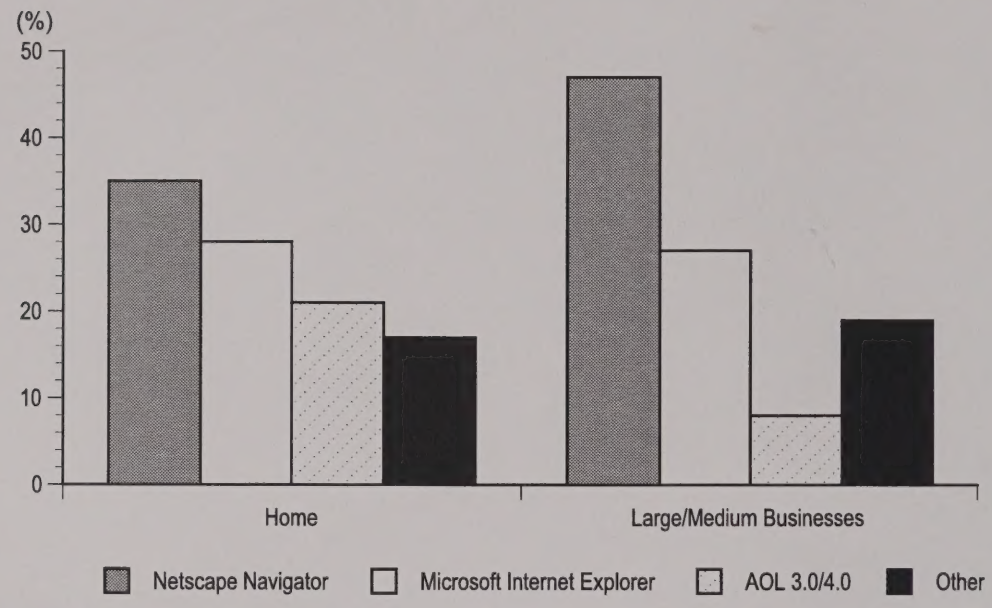
What does this mean for Yahoo!, Excite, Lycos, and AltaVista? Can standalone portals survive without strong content or access partners? Will other portal networks have enough money to promote multiple brands?

TV NETWORKS JOIN INTERNET FRAY

On another level, the TV networks loom, trying to leverage their heft with the nimbleness displayed by the Internet players. After all, eyeballs are eyeballs, and the network players want to retain their share of revenues whether from networks or the 'Net (see Figure 3 and *U.S. Consumer Internet and Online Service Forecast 1996-2001,* IDC #14567R, November 1997). Already, the camps are forming:

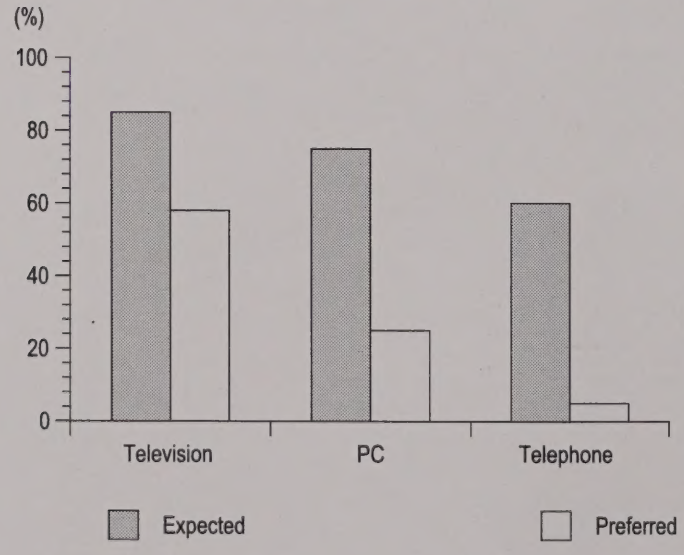
- ABC — Disney/Infoseek and the Go Network
- NBC — MSN and Snap
- Other potential players — CBS, Time-Warner, and NewsCorp/Fox

FIGURE 2
U.S. BROWSER SHARE BY MARKET SEGMENT, MIDYEAR 1998 (%)



N = 669 Home; 102 Large/Medium Businesses
Source: International Data Corporation, 1998

FIGURE 3
U.S. NEW MEDIUM PLATFORMS SHARE, 1997 (%)



N = 1,793
Source: IDC *1997 U.S. Home Media Consumer Survey*

AOL Goes Commerce

AOL's proposed acquisition of Netscape is also a bold move to add industrial e-commerce capabilities. AOL could become the e-commerce avenue of choice for consumer goods companies as well as for small business users, a majority of which use AOL as their online service provider (see Figure 4 and *U.S. Small Businesses on the Internet,* IDC #16319, June 1987).

IDC believes online services may have been the primary means for Internet access among small businesses, although some may have been accessing the Internet through both an ISP and an online service.

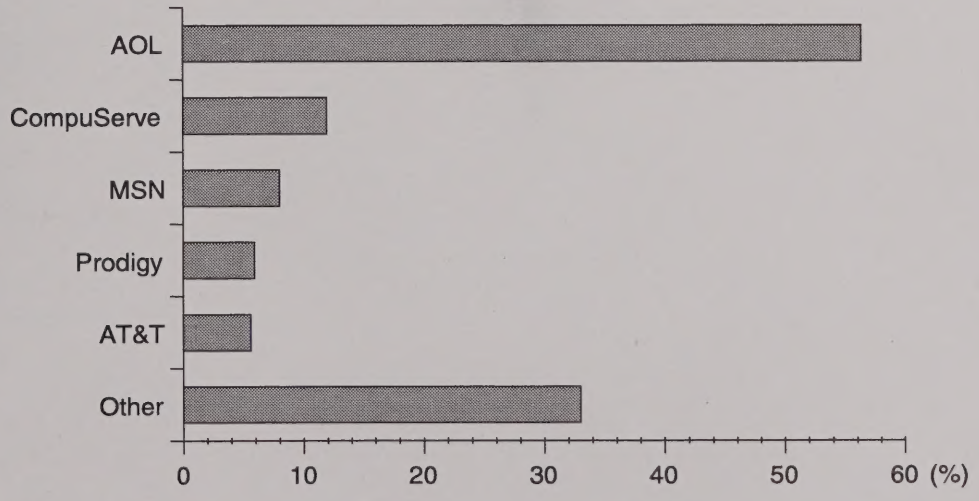
Small businesses are also ramping up their activity in e-commerce. Among small businesses using the Internet, 16% in 1997 said they were selling products or taking sales leads over the Internet. However, nearly 25% said they expect to use the Internet for commerce within a year (see Figure 5). Commerce is the fastest growing use of the Internet among small businesses.

Sun Gets Free Ride

The proposed AOL/Netscape deal also involves Sun on several fronts. If Sun plays its cards right, it could benefit substantially. Some of the aspects of the Sun deal include the following:

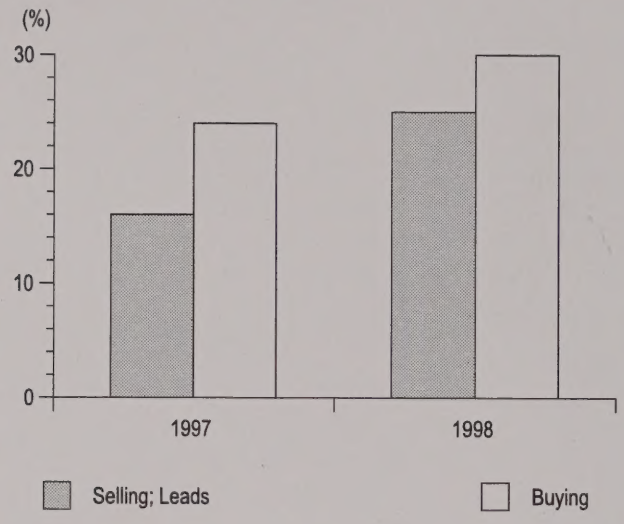
- **"Javagator" — reborn.** Suddenly Sun has an avenue for propagating Java everywhere, in conjunction with AOL's unannounced vision of AOL-Anywhere. Things could get very interesting, and Microsoft could find itself with a challenge to CE and its intentions for the appliance world.
- **Sun servers get respect.** As part of the deal, Sun will provide servers to AOL. IDC research has shown that users tend to look at ISP choice of servers when contemplating constructing their own Internet infrastructures.
- **Sun as software vendor.** Sun also gets to market and codevelop (for three years) Netscape's respected enterprise products, such as the CommerceXpert family and Netscape Applications Server, Mission Control, Internet Messaging Server, and Enterprise Server software. What is not clear is whether a hardware vendor can be a successful supplier of a premier e-commerce solution across other platforms — especially when that hardware vendor is Sun.
- **Thin clients.** Sun intends to carry the flag for thin-client networked computers.

Figure 4
Online Service Providers Used by Small Businesses, 1997 (%)



N = 306
Multiple responses were allowed
Source: International Data Corporation, 1998

FIGURE 5
SMALL BUSINESS INTERNET COMMERCE USE, 1997–1998 (%)



N = 411 Internet users
Source: International Data Corporation, 1998

Sun needs to think about the possibility of new rules in the e-commerce software domain. Sun may find it can reap more rewards by continuing to propagate the Netscape software as cross-platform than by converting it into a Sun-mostly-software product.

The Netscape software suite provides more breadth than other e-commerce-related offerings, and provides Sun an unparalleled opportunity.

There are really two issues here. Will Sun continue Netscape's trend of focusing on ISPs rather than corporate buyers? And can Sun really think and act like a software company?

Sun executives Scott McNealy and Ed Zander are lucky. With the benefit of hindsight, they still have a chance at the brass ring that Apple sadly missed as it peddled a hardware/software package.

Sun does acquire some issues to resolve. It is doubtful Sun's new position in the software space will be appreciated by other Sun ISVs. Sun's software scene is further confused, given that Sun has already acquired NetDynamics, which overlaps in the application server space occupied by Netscape's Application Server. However, Netscape's products are more open than NetDynamics, and thus more in keeping with Sun's support of open application programming interfaces (APIs). Sun has said it plans to merge the two products after the AOL deal is consummated.

Looking at Sun's progress in other software arenas, Sun has at last become somewhat ecumenical and will provide Solaris for use on Intel systems in efforts to block further NT incursion into its space.

The two most significant implications of Sun's involvement in the deal are the propagation of Java and the uncertain fate of the Netscape enterprise software. Basically, *The Gray Sheet* believes Sun did not have to pay its dues to gain access to the Netscape e-commerce cookie jar. The swap of hardware and software costs nets out fairly evenly, so the bad news is that Sun may not feel compelled to use the Netscape software for anything other than its own purposes.

JAVA EVERYWHERE

Sun is very interested in propagating Java in hopes that the profusion of thin-client devices will fuel demand for (its) servers. Sun also wants to be seen as a supplier of the complete Internet food chain — from the design of the picoJava chips to Java to servers.

Sun has made a couple of moves in order to improve its perception as a Java propagator.

In its latest reorganization, Sun reined in its autonomous business units, making them divisions, and focused these divisions on serving the corporate goal rather than on simply pursuing revenues. For example, in order to pursue the corporate goal of propagating Java-based devices, Sun MicroElectronics has decided not to produce its picoJava chip. Rather, it will focus on licensing its picoJava core for production by other manufacturers, thereby creating a level playing field for licensees who will tailor the chip with added-value features.

Products based on picoJava may be released by mid-1999. Fujitsu, IBM, LG Semicon, NEC, and Rockwell are picoJava licensees.

Pay Later

Sun is emphasizing the need to obtain royalties rather than license revenues from Java — a switch made after it watched HP form its own rump group for embedded Java. In the new scheme, Sun edges toward the open source movement, but stops short.

Sun will allow free downloads of Java source code but will extract royalties when the developed products are put on the market. Sun also requires the products to undergo a Sun compatibility test.

AOL Anywhere

While Sun has been toiling toward "Java everywhere," AOL has been hatching its vision of AOL Anywhere. The objective of AOL Anywhere is "to extend AOL's brand to all emerging mass-market platforms, expanding its potential consumer audience beyond PC households and ensuring its participation in any new user market that evolves," according to Sean Kaldor, IDC VP of Consumer Devices Research.

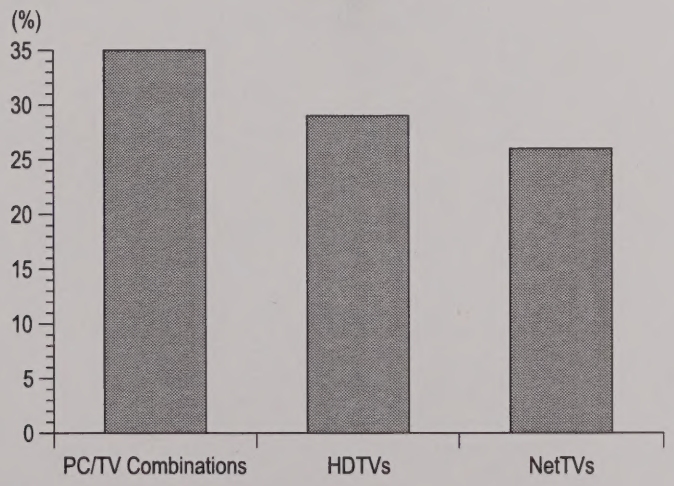
One can expect AOL and Sun to collaborate on delivering an AOL Java client for assorted thin clients, ranging from the currently contemplated screen phones, netTVs, etc., to the future appliance generation.

Kaldor expects the agreements with Sun and Netscape to accelerate the AOL Anywhere strategy, so an announcement in 1Q99 or 2Q99 is likely if AOL exerts some management discipline over the project deliverables and establishes a firm announcement date.

AOL is not about to cede the 'NetTV arena to Microsoft. AOL TV is expected to bring the AOL service to a TV-based device and possibly enhance the content to include broadcast-level material, Kaldor noted.

Figure 6
U.S. Consumers' Awareness of Next-Generation Technologies

How familiar are you with each of the following new technologies?



N = 1,661

Source: International Data Corporation, 1998

AOL has been connecting the dots for its designs on 'NetTV. Recent moves include the following: the AOL/Sun agreement, the acquisition of NetChannel, and the lawsuit against cable TV operators to give consumers choice in cable-based ISPs.

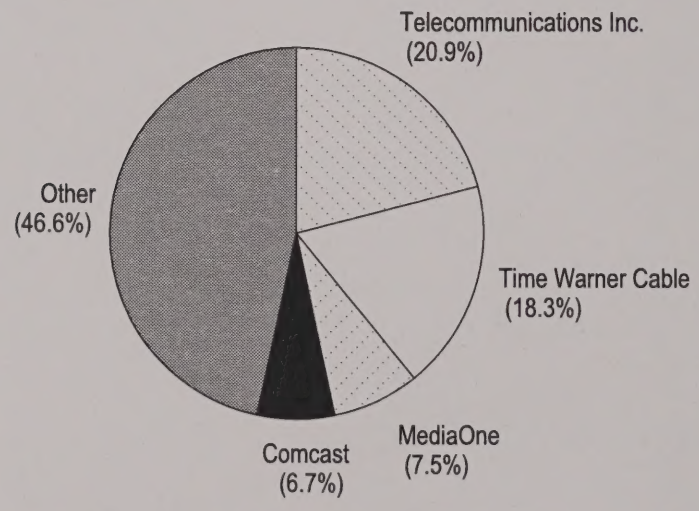
AOL TV could emerge as a viable contender to WebTV, which currently has a base of about 500,000 users. The cable moguls have long been wary of the Redmond empire, after viewing the state of the PC software industry, and have expressed reluctance to cede total control to Microsoft. They may welcome AOL as an alternative supplier.

In IDC's 1998 U.S. Consumer Devices Survey, more than one-quarter (26%) of respondents said they were aware or were fully aware of 'NetTVs (see Figure 6 and *Review and Forecast of the Worldwide Net TV Marketplace, 1997-2002*, IDC #17316, November 1998).

The U.S. cable industry is still very fragmented, with more than 58 players in the market. However, the top four vendors have 53% of the total market (see Figure 7). AOL might like to partner with several cable operators to carry their service. But it is interesting to ponder the prospect of a completely vertically integrated AOL offering if AOL were to acquire a cable operator. In that case, AOL would provide the set-top (AOL TV) and the cable operator(s) as delivery mechanism and supplier of additional content. Microsoft, the other player, already owns WebTV and an 11.5% share in cable operator Comcast.

AOL and Microsoft will continue to meet as future 'Net devices come to market.

FIGURE 7
TOP U.S. CABLE OPERATORS, 1997 — SUBSCRIBER MARKET SHARES



Source: International Data Corporation, 1998

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THE GRAY SHEET

IDC's forecasts of IT opportunities

The Need for Speed: What the Industry Offers, What Users Demand

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October 15, 1998
IDC # 18016
Vol. 33, No.13

At every industry event, plucky software applications vendors and Internet content companies tout their recent works of genius, but under scrutiny they often confess their latest simulation program or video/audio streaming offering works best through a commercial-strength pipe.

For the past three years, Internet proponents have heralded the cry, "The bandwidth is coming, the bandwidth is coming!" but only in 1998 have high-speed Internet connections been offered in any real volume for home and small-business consumers.

The wait has left everyone associated with the Internet asking questions like the following:

- Will cable companies, currently leading the charge to the home market, be able to manage Internet service offerings?
- Will phone companies overcome their trepidation about upgrading their networks for xDSL (even if it means sharing the new facilities with competitors) and join the fray?
- Will all of these build-outs be moot in the face of a newer, faster Internet proposed by the federal government?
- Perhaps most importantly, do customers even want faster data transmission (and would they pay for it)?

Recent IDC research indicates that users do demand better performance from their Internet connections. In last year's Home Media Survey, IDC polled Internet users who canceled their subscriptions to find out why they gave up the service. Although cost and lack of use were primary reasons, 10% of quitters cited slow access as the main reason they grew frustrated and discontinued their accounts.

Frustrated Internet users will not gain respite from slow access speeds through a "new" Internet, however. IDC analysis shows that despite what some reports in the popular press say, the new Internet will not be available for public use any time in the near future.

Improvements to today's commercial Internet infrastructure will be the only salvation for the World Wide Web's tired masses — and the only realistic saviors on the horizon for consumers and

THE GRAY SHEET

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small-business folks will be cable modems and xDSL.

This issue of *The Gray Sheet* shows what will become of the government's new Internet (and why the new infrastructure won't be commercialized). This issue also presents forecast data for some present-day Internet access products in an effort to predict the Internet community's real need for speed.

What Is the New Internet?

The federal government and the nation's academic institutions are committing funds to create a second-generation Internet that is more conducive to bandwidth-sucking research than is the crowded commercial Internet.

The second-generation Internet is being called a variety of names, largely without accuracy. The new Internet is *not* synonymous with Internet2 or NGI or vBNS; rather, it is a combination of these very separate entities.

The physical plant of the new Internet is the vBNS, a very high-speed backbone created by MCI under an award from the National Science Foundation (NSF). This network connects five major supercomputing centers around the United States.

Next Generation Internet (NGI) is a federal initiative created by the Clinton administration to foster the development of a new Internet. In effect, NGI is the sugar daddy that funnels funds to NSF and other government agencies (including NASA and the Department of Energy) so that they may develop high-power applications and high-power networks to connect to the vBNS.

Internet2, the name most often used (mistakenly) to mean the new Internet, is actually a consortium made up of universities that pool knowledge and resources. Metaphorically speaking, if NGI starts at top government agencies and trickles funding down, Internet2 starts at the ground level and trickles funding up.

Internet2 universities (to be admitted to the consortium) build their own networks, link with each other, and connect to "gigapops," network points of presence that are capable of transferring data at 1Gbps. Most Internet2 universities have access to the vBNS, but not all do. Only universities that receive permission from the NSF can connect to the vBNS.

What Will This New Internet Do?

First and most importantly, the new Internet will sustain a leading-edge network for the national research community. The privatization and frequent congestion of the commercial Internet have deprived many faculty members of the network capability needed to support world-class research. The NGI and Internet2 were created to remedy this congestion, and at the moment the vBNS appears to be the cure that these researchers are turning to.

The Internet2 consortium (and presumably NGI affiliates as

well) also directs network development efforts to enable a new generation of applications to fully exploit the capabilities of broadband networks — media integration, interactivity, and real-time collaboration, to name a few.

Another major goal of the new Internet is to rapidly transfer new network services and applications to all levels of educational use and to the broader Internet community, both nationally and internationally.

What the new Internet will not do is replace the commercial Internet or offer consumers another form of Internet connectivity. The commercial Internet will take advantage of breakthroughs in networking technology as Internet2 members, NGI-funded institutions, and corporate partners from either group leverage new product developments into the commercial Internet.

The key applications that the new Internet will address include teleimmersion programs, quality-of-service applications (which enable applications to specify requested bandwidth), and a plethora of applications that haven't been conceived yet. Computation-intensive research and complex telemedicine applications should be the first to benefit from the speed of the new Internet.

The Money Trail: A Winding Road

As one might expect when various government agencies and public and private consortiums get involved with an issue, following the money becomes a tricky task.

At the most basic level, the NSF used a combination of its own funds and the money it receives from NGI to pay MCI $50 million over five years (starting in 1995) for network construction of the vBNS.

At the federal level, the NGI initiative committed $100 million per year over three years (starting in 1998) to various government agencies — NSF, Department of Energy, Department of Defense, NASA, and several others. For example, NSF will receive $10 million in 1998 from NGI, a portion of which will go directly to MCI to pay for some of its network services.

NSF also distributes grant money to qualified institutions that apply to the High Performance Connections Program (HPC). Schools that receive an HPC award are permitted access to the vBNS and can receive up to $350,000 (for a two-year grant). More than 90 schools and nonprofit organizations were granted access to the vBNS, and the majority of these institutions were given cash awards.

The Internet2 consortium does not give out grants or awards. On the contrary, schools pay $25,000 to join and must meet certain infrastructure requirements to belong to Internet2. Gregg Wood, spokesman for Internet2, estimates that the investment the schools must make to meet the network infrastructure requirements for Internet2 is about $500,000 per year (depending on the size of the school and the applications it wishes to develop for the new Internet). More than 100 schools belong to Internet2.

Vendor Involvement

In most cases, schools and organizations can use grant money as they see fit to implement the networks they need for Internet2 or vBNS connectivity. With well over 100 schools either belonging to Internet2 or having vBNS connectivity (or both), IT spending for connectivity to the new Internet should exceed $50 million per year.

In the context of the overall U.S. IT market ($320 billion in 1997) $50 million is not a lot of money. However, the implicit value of working with the new Internet is prompting many vendors to get involved.

MCI is losing money from its relationship with NSF because the $10 million it receives annually as part of its $50 million grant to build the vBNS does not cover the manpower and capital costs involved in creating and maintaining a network of such caliber. However, the advances in engineering and public relations attributes it gets from working with the paramount network in the world justify the expense.

The Internet2 consortium has a number of corporate partners and affiliates that donate equipment and expertise for the development of the gigapops and university-level networks (which also must be quite advanced) to support vBNS connectivity. Representatives from these companies

(including IBM, Cisco, Bay, and more) were unavailable to comment regarding the return on investment in their Internet2 partnerships. From the budget figures above, one can assume that schools aren't spending breathtaking amounts on IT, so IDC assumes most Internet2 corporate partners are gaining more from expertise development and experimentation than they are from equipment sales to Internet2 schools and organizations.

IT vendors that don't participate as Internet2 partners can still gain from the new Internet. Bell Atlantic has used the new Internet as another reason to apply for the right to offer interstate Internet connectivity.

Other communications providers will see revenues from the development of the new Internet as well. Because schools can use local or preferred ISPs to link to the regional POP that connects them to the vBNS, any communications vendor has a chance to provide connectivity. IDC does not expect connectivity to constitute the lion's share of costs, however. A spokesperson at the Internet2 consortium estimates that 80% or more of IT spending involved with the new Internet stays "on campus" to develop the local area infrastructure.

A Potential Cure, But Not a Pain Reliever

From the perspective of commercial Internet users, the developments and breakthroughs created by the new Internet may lead to improvements in today's public infrastructure, which is beleaguered by high traffic volume and over-size file transfers. However, the NSF, participating universities, and participating vendor partners have plenty of motive to keep the new Internet a closed system not to be used as an overflow for commercial traffic.

Dragsters for Today's Information Highway

Even if generations pass before the general public is allowed to migrate to a super-fast new Internet infrastructure, early adopters are already investing in data com products to enhance the experience on today's Internet. What products can they choose from, and what are the advantages to each?

IDC finds six different types of high-speed access technologies available for the consumer or small business markets including the following:

- ISDN (BRI)
- Cable modem
- xDSL
- Fixed wireless (two types)
- Satellite
- Fiber lines

With the exception of ISDN, all of these technologies are in the very early stages of deployment, and not all consumers have access. Table 1 shows the speed of the technologies listed above, the number of U.S. households that have access to the technology, and IDC's estimate of how many customers actually subscribe.

Only ISDN and satellite are available to the majority of U.S. homes.

IDC believes that service availability will be a critical factor when consumers decide to purchase high-speed Internet access. Ironically, the two most available services (ISDN and satellite) offer drawbacks that may be large enough to discourage users from adopting. ISDN has struggled to find a following for some time, and consequently it may not offer the speed users will demand when compared with newer rival offerings. Satellite offers high-speed downloads but still requires users to use a phone line for upstream communication; it also requires a start-up investment many consumers won't be willing to bear — purchasing expensive satellites and receivers.

By 2002, IDC expects the leading residential high-speed communications technologies to be cable modems, xDSL, and — to a much lesser degree — ISDN, respectively. Table 2 shows the forecasted adoption for high-speed technologies, ranked by expected adoption at the end of the forecast period.

Figure 1 shows the overall penetration rate for high-speed connectivity.

Cable Modems

Cable TV operators have completed their initial tests of cable modems and begun to market Internet access in earnest in selected markets. Given pent-up demand for high-speed Internet access and lack of competition, operators have been able to

TABLE 1
U.S. RESIDENTIAL HIGH-SPEED DATA TRANSMISSION TECHNOLOGIES BY SPEED, AVAILABILITY, AND NUMBER OF INTERNET CUSTOMERS, 1998

Technology	Speed	U.S. Availability Households (M)	Estimated Internet Access Customers
ISDN (BRI)	128Kbps	90+	100,000
Fixed wireless (2GHz)	Up to 5Mbps	Fewer than 10	Fewer than 10,000
DSL	128Kbps-8Mbps	3	Fewer than 25,000
Cable modem	Up to 10Mbps	5	287,000
Satellite	DirecPC: 200-400Kbps100 downstream. New ventures: 1.5-20Mbps		
Fixed wireless (24GHz, 28GHz, 38GHz)	Up to 1Gbps	0	0
Fiber to the home	Up to 100Mbps	Fewer than 1	Fewer than 100,000

Source: International Data Corporation, 1998

achieve penetration rates of 7% of households in areas in which they are marketing the service, although 2-4% penetration rates are more typical.

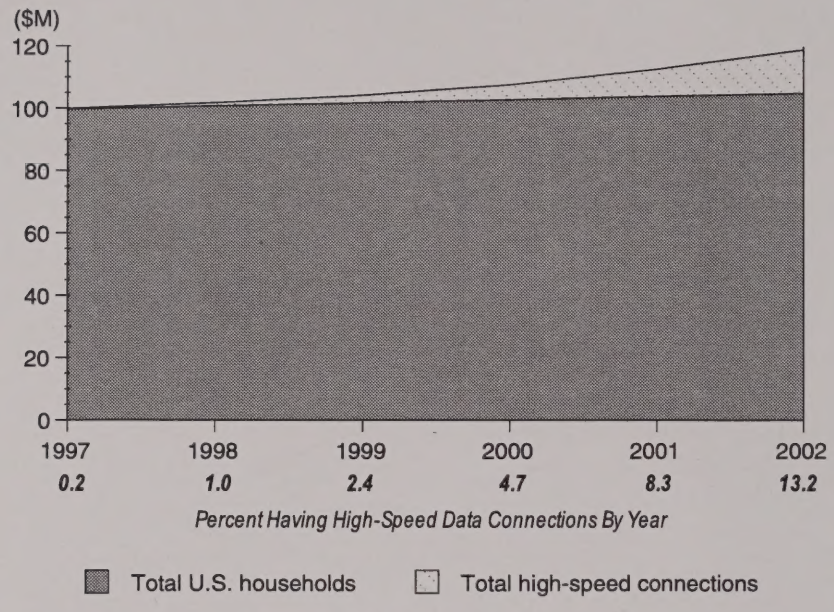
Although many cable multiple system operators (MSOs) initiated development of their own Internet access services in the early 1990s, most have now become affiliates of either the @Home Network or Road Runner/ MediaOne Express. Both these organizations manage the backbone network and provide "high-bandwidth" content as well as marketing support to affiliates that execute local marketing. Local operators, which typically

TABLE 2
U.S. HIGH-SPEED INTERNET ACCESS DEVICES BY CONNECTION TYPE, 1997-2002 (M)

	1997	1998	1999	2000	2001	2002	1997-2002 CAGR (%)
Cable modem	0.010	0.630	1.670	3.350	5.600	8.150	282.1
DSL	0.003	0.021	0.203	0.707	0.995	4.230	332.3
ISDN	0.166	0.265	0.393	0.532	0.712	0.904	40.3
Wireless (20+GHz)	0.000	0.001	0.003	0.020	0.100	0.300	395.9
Satellite	0.035	0.085	0.130	0.185	0.225	0.250	48.2
Wireless (2GHz)	0.001	0.002	0.004	0.010	0.025	0.050	118.7
Total	0.215	1.003	2.402	4.805	8.657	13.884	130.1

Source: International Data Corporation, 1998

FIGURE 1
PENETRATION RATES FOR HIGH-SPEED ACCESS DEVICES IN U.S. HOUSEHOLDS, 1997-2002



Source: International Data Corporation, 1998

price service at $39.95 per month, also develop local information services. At midyear, @Home counted 147,000 subscribers while MediaOne reported 41,000 and Time Warner 50,000.

A few operators, such as Adelphia and InterMedia Partners, are offering one-way modems in order to initiate data-over-cable services more quickly. However, most MSOs have initiated plant upgrades to deploy two-way modems. Because these upgrades are an expensive and time-consuming proposition, some are proceeding slowly in order to gauge penetration rates in initial markets.

Some MSOs, like MediaOne, have set an aggressive timeline for plant upgrade. That company already offers high-speed data service in several areas, including Boston, Los Angeles, Jacksonville, Detroit, and Atlanta. Shortly, MediaOne will launch service in Minneapolis. TCI is proceeding with upgrades and is expected to increase that pace, given its pending merger with AT&T.

xDSL

xDSL is the technology that allows local carriers to transmit digital data through traditional copper phone wire. There are several varieties of xDSL, and ADSL will be the type commonly deployed for home use.

Each of the RBOCs and GTE have or very soon will have initiated marketing of ADSL-based services to residential customers. In addition, a few competitive local exchange carriers (CLECs), such as Covad and its ISP partners, will be players in the residential market. Other CLECs such as NorthPoint Communications also plan to utilize DSL but are currently focused on business users.

U S West was the first RBOC to announce plans for broad ADSL deployment. The company initiated service in Phoenix and is

quietly launching the service in other metro areas in order to be able to meet demand.

By the end of the year, it plans to have the service available on 5.5 million lines across 40 cities. Similarly, GTE, Pacific Bell, and Covad each plan to make ADSL service available to 4 million to 5 million lines by yearend. Ameritech, Bell Atlantic, and BellSouth will initiate service in 1998 but will expand availability beyond a few million lines in 1999.

In order to expand the market for ADSL, local exchange carriers typically offer service tiers defined by download speeds and package ADSL with Internet access service. For example, Bell Atlantic will market Personal InfoSpeed, which offers speeds of up to 640Kbps packaged with Bell Atlantic.net Internet access at $69.95 per month for unlimited access. Its Power InfoSpeed service, which offers speeds up to 7.1Mbps and Internet access, is priced at $189.95 per month. ISPs are also packaging DSL with Internet access, but they differentiate service offerings through metered usage rather than data speed. In Seattle, Northwest Link's basic DSL service has a base price of $10 per month, and data transfers are billed at $12 per gigabyte on a prorated basis.

ADSL is becoming a viable alternative to ISDN and dedicated leased lines. In many cases, it is a faster and less expensive means for transmitting data and can accommodate voice. xDSL trials in the early 1990s concluded that the technology was not appropriate for video transmission. However, the technology has been improved and may yet be viable for video entertainment. In the fall, U S West will conduct a trial of video-on-demand service over ADSL. It is also seeking franchise agreements to offer cable TV over VDSL in municipalities in the Phoenix area.

ISDN

For many years, ISDN was a technology in search of an application. Ironically, now that consumers want high-speed data delivery, ISDN isn't fast enough. However, the incumbent local exchange carriers (ILECs) have become much smarter about marketing it. Service packages that include customer premises equipment (CPE), voice and data services, or Internet access are increasingly common and heavily promoted.

Although it is already becoming dated as a data communications technology, ISDN shipments will continue to grow through the forecast period.

At yearend 1997, 166,404 Basic Rate Interface (BRI) ISDN lines were installed at residences throughout the United States. IDC/LINK projects that the number will grow to 903,957 by yearend 2002. This growth will be driven by end-user need for higher-speed Internet access and ISDN's availability. Other technologies may offer higher speeds, but their availability will be spotty. In addition, ISDN offers work-at-home households the flexibility to use the line for both voice and data applications.

Several incumbent local exchange carriers launched ISDN promotions in 1998 because they have the service available today. For example, on August 1, SBC's subsidiaries launched a new ISDN service, the ISDN Extra Access Plan, which includes 150 hours of Internet access at 128Kbps for $29.95 per month or an annual payment of $299.95.

If We Build It, Will They Come?

Residential online/Internet users are frustrated with dial-up connections to the "World Wide Wait." Furthermore, the market for high-speed data services extends beyond current online/Internet households. A third of current PC households that are not online are interested in purchasing a high-speed data service. Today, 20% of households that currently do not own a PC plan to do so in the next 12 months. One in four respondents planning to buy a PC expressed interest in purchasing a high-speed modem service.

Content providers would like to enhance their services with more graphics and video but are hesitant to move forward with bandwidth-hogging programming because it will only increase user frustration. The answer to this dilemma is high-speed local access services.

Nearly 11% of respondents to IDC/LINK's 1998 *Residential*

Telecommunications Survey expressed plans to buy high-speed modem services within 12 months (see Table 3). Respondents were qualified by owning a PC with a modem or planning to own one within 12 months.

Interestingly, 12% of respondents to the survey did not know if they would purchase a high-speed modem within the next year. If data com vendors can win the minds of this 12%, the market for high-speed access will grow extremely quickly.

TABLE 3

U.S. PLANS TO PURCHASE HIGH-SPEED MODEMS BY USER TYPE, 1998 (%)

Do you plan to subscribe to any high-speed services within the next 12 months?

	Total	Telecommuter	Corporate After-Hours	Self-Employed	No Work at Home
Yes	10.8	28.6	12.6	10.3	9.7
No	77.2	66.7	74.5	79.4	78.3
Don't know	12.0	4.8	12.9	10.3	12.0
N =	1,001	21*	286	97	391

*Readers should note small survey size.

Source: IDC/LINK's *Residential Telecommunications Survey*, 1998

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Passing Go:
Is Network Solutions' Monopoly Really Over?

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October 1, 1998
IDC # 18017
Vol. 33, No.12

Sometimes maligned and often taken for granted, Network Solutions is the company that keeps the Internet working. Every e-mail that's exchanged and every home page that goes live requires Network Solutions' management of the domain name system to ensure Internet data is routed properly.

But Network Solutions' honor is a dubious one. The company was awarded the exclusive contract to register domain names when the National Science Foundation outsourced the job in 1993. As soon as potential competitors realized the value of the deal, they started crying "monopoly."

Five years later, just as Network Solutions' contract with NSF was to expire, Network Solutions received a two year extension with an amendment. Under the terms of the extension agreement between Network Solutions and U.S. Department of Commerce's National Telecommunications and Information Administration (NTIA), NSI will share the registration of the Internet's top-level domains (TLD) such as com, .net, and .org with other companies in a phased approach. NSI is to begin phasing in the shared registration system March 31, 1999, with full implementation by June 1, 1999. Under the shared system, NSI will continue to serve as the registry, or wholesaler, of domain name registrations. but other domain name registrars, as well as NSI, will act as retailers of domain name registrations.

For the longer term, the Internet community — if not the world — needs a concrete plan to systematically open the domain name business to competing companies. A plethora of government bodies and coalitions of Internet wonks have all contributed their plans defining how the transition should occur, but the government agencies close to the issue have the final say.

The government line, which appears to be the accepted line, is that the transition will be implemented under the supervision of a board of experts (most likely with international representation).

This board of experts will set the technical benchmarks for would-be domain name players; it will also decide what — if any — new top-level domain names will be created. (Top-level domains are the three-letter suffixes to all Web addresses, like .com, .org, and .net.)

Network Solutions and the government-funded IANA (Internet Assigned Names Authority) have proposed ICANN (Internet Corporation for Assigned Names and Numbers) as the new board of experts. ICANN would count

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among its members Esther Dyson, Ray Smith (chairman of Bell Atlantic), Dennis Jennings (formerly of the NSF), and other members with international ties.

As the world's lead Internet geeks and politicians hammer out the final step in commercializing the World Wide Web, two questions come to mind: Will the transition be painless for the millions of people who rely on the Internet each day to communicate and to conduct trade? What will become of Network Solutions, the company that has maintained the Internet for so long and has developed a healthy business for its efforts?

This issue of *The Gray Sheet* will examine these questions.

Question 1: Is the 'Net Headed for Chaos?

Of the two questions posed in the introduction of this newsletter, Question 1 is easiest to answer. The Internet is not headed for chaos. All the entities involved in the domain name game recognize the importance of keeping data flowing smoothly.

At the center of the Internet are the root servers, the servers that store the names and addresses. Network Solutions manages these servers for .com, .net, and .org, and will continue to administer the primary root server and act as a root zone administrator until the government tells NSI to transfer either or both of these functions to a new administrative body or another entity. New players may manage root servers for other top-level domains if they are added.

The new board of experts, when it is finally created, will review any company that wishes to become a registry and manage the root server for a top-level domain. The qualifications to become a registry are strict.

In short, the likelihood of a major Internet crash or frequently errant data transmissions is pretty slim.

Question 2: What Becomes of Network Solutions?

Network Solutions reported revenues of $45.3 million in 1997, an increase of 140% over 1996's $18.9 million. IDC estimates that 85% of Network Solutions' 1997 revenue came from registering Internet addresses. The remaining 15% of revenue came from Network Solutions' intranet consulting business.

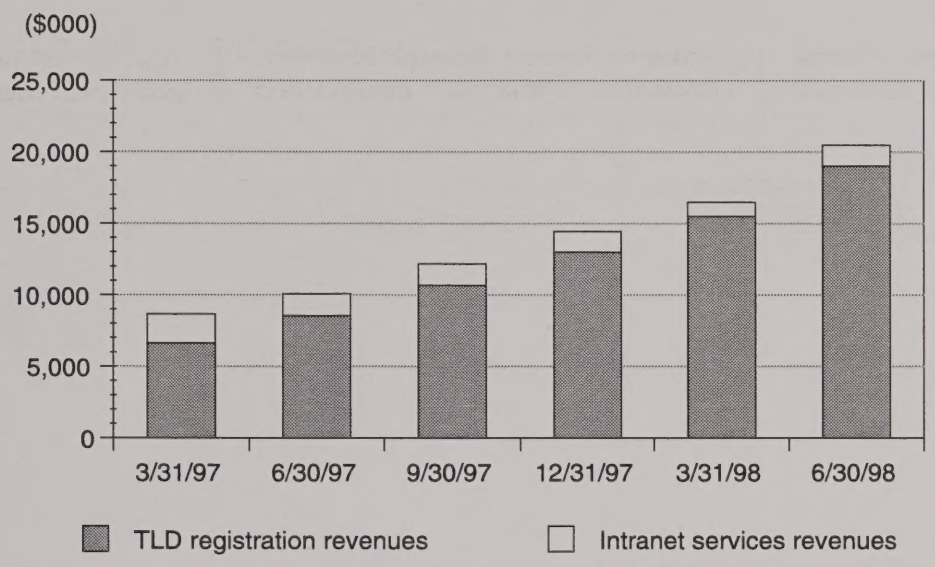
Although Network Solutions expects to grow its intranet consulting business, in the short term the company will see domain name registration constitute the lion's share of its revenues. The growth rate in Internet acceptance is the prime reason for the widening split in Network Solutions' revenues (see Figure 1).

How Network Solutions Makes Money in Domains

The domain name game can be complicated and difficult to understand, and recent policies set forth by the U.S. government don't necessarily clarify matters. Network Solutions' role in the game is as follows.

As the Internet changed from a scientific/military/academic network to a commercial network,

FIGURE 1
NETWORK SOLUTIONS' REVENUE SPLIT BETWEEN DOMAIN NAME REGISTRATIONS AND OTHER SERVICES, PREVIOUS SIX QUARTERS



Source: International Data Corporation, 1998

the Internet's supervising institution, the NSF, saw the need to outsource the domain name registration process. In 1993, it awarded the contract for registering domain names ending in .com, .net, and .org to Network Solutions exclusively. NSF justified the exclusivity of this contract because the Internet was still in its infancy — an exclusive registrar could most efficiently resolve the inevitable squabbles over duplicate names and manage interaction with the Internet root servers that direct traffic to the appropriate addresses.

The NSF granted Network Solutions permission to charge customers $100 for registration for a two-year subscription, $30 of which would be placed into escrow for the NSF to use to fund infrastructure improvements as the Internet grew. Network Solutions recognized the remaining $70 prorated on a month-by-month basis through the duration of the registration; companies were entitled to renew at the same rate. The $30 charge for the NSF's proposed network

TABLE 1
NETWORK SOLUTIONS REVENUE AND INSTALLED BASE, PREVIOUS EIGHT QUARTERS

	1996		1997				1998		9/96–6/98 CQGR
	30-Sep	31-Dec	31-Mar	30-Jun	30-Sep	31-Dec	31-Mar	30-Jun	(%)
Revenue ($000)	5,180	6,853	8,655	10,069	12,172	14,430	16,492	20,476	21.7
Installed base of registered names (000)	461	627	818	1,040	1,296	1,587	1,862	2,289	25.7

Note: CQGR = Compound Quarterly Growth Rate

Source: International Data Corporation, 1998

improvements has since been removed, and registration fees now stand at $70.

When the math is done, Network Solutions is the most basic of subscription companies. It recognizes $8.75 per quarter per registered domain name in its installed base (on average, depending at which point in the quarter a customer registers a name).

As subscriptions grow and, consequently, Network Solutions' installed base of registered names grows, Network Solutions' revenue increases accordingly. Table 1 shows Network Solutions' revenue growth and growth in the number of registered domain names during the previous eight quarters.

Network Solutions' quarterly revenue growth has slowed somewhat from IDC's first review six months ago (See *Monopoly Money: Can Network Solutions Remain on Boardwalk,* IDC #15790). However, the company's growth is still quite aggressive.

How The Government Changes Things

The government's plan to open the domain name registration market to competition changes the picture for Network Solutions in several ways. Under provisions in the Green Paper, released in February by the Department of Commerce and Ira Magaziner, the name registration business will be split into two tasks: name registration, which will be handled by commercial organizations called registrars, and database management, which will be handled by organizations called registries.

Under the government proposal, the number of registrars will be limitless. Any organization that can meet government regulations will be eligible to register domain names. Currently, Network Solutions is the sole registrar for .com, .net, and .edu. Soon it will have competition in this space.

Unlike registrars, under the government proposal, the number of registries will be quite limited: one database for each top-level domain name. For example, one registry will maintain the database of registered domains (with their corresponding numerical IP addresses) for the top-level domain called .com, one registry will maintain .net, and so forth.

The feds have decided (probably prudently so) that opening up database maintenance to competition could create reconciliation issues among database managers and ultimately lead to performance issues for the Internet.

In June, the Department of Commerce released its follow-up to the Green Paper, the White Paper, which broached the topic of establishing a non-profit corporation, or a board of experts, to facilitate the changes proposed in the Green Paper.

The non-profit corporation also will be responsible for approving new top-level domains, like .web, and .per. These new top-level domains, if approved, could pose a form of competition for Network Solutions.

How the Internet Keeps Things the Same

Were Network Solutions a traditional subscription service, the introduction of competition on various levels would most surely mean more limited growth. However, several factors in Network Solutions' situation can mitigate the damage from would-be competitors.

Customers who have registered their domain names with Network Solutions will have to change their Web addresses if they elect to change their top-level domain. For example, IDC could change its top-level domain to the new .web domain, thus becoming www.idc.web instead of www.idc.com — but then any IDC customers who did not know of the name change would receive an error message every time they pointed their browser at www.idc.com.

Needless to say, businesses in competitive markets cannot tolerate any disconnects with their client base, even subtle ones like changes in domain names. IDC believes that once companies establish an identity in cyberspace, they will keep it.

Historical data about Network Solutions' churn rate substantiate this belief. In seven quarters for which churn rate data are available, only 6% of domain name registrants canceled their subscription or elected not to renew.

In short, Network Solutions' subscriber base is a cash cow not likely to kick the bucket any time soon.

Kill Them with Volume

Network Solutions' lock on its subscriber base is great, but it doesn't ensure that the company will grow. The Internet itself may provide such assurance, however.

TABLE 2
IT-ENABLED BUSINESSES* WITH A HOME PAGE ON THE WORLD WIDE WEB BY REGION, 1997-2000

	1997	1998	1999	2000	1997-2000 CAGR (%)
United States	1,886,242	2,238,774	2,491,520	3,323,797	20.8
International**	4,161,454	4,865,768	6,133,936	9,001,036	29.3
Worldwide	6,047,696	7,104,542	8,625,456	12,324,833	26.8

* Businesses having at least one computer in the organization

** Countries sampled in IDC's ***Global IT Survey***

Source: International Data Corporation, 1998

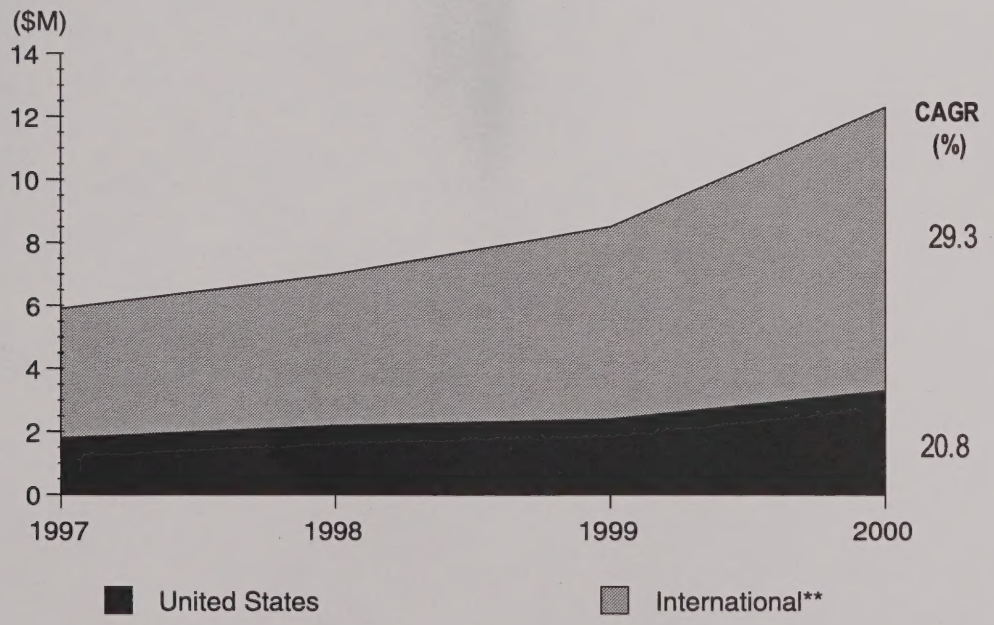
IDC expects Network Solutions' fortunes to be closely tied to the growth rate for businesses needing a Web presence. Published survey data shows this growth to be strong, and unofficial analyses indicate that there is potential for tremendous upside above and beyond the forecasts in Table 2 and Figure 2.

IDC uses the home page as an indicator of presence on the World Wide Web.

Table 3, extrapolated from these data, puts the number of businesses with home pages in perspective with the number of computerized businesses and number of businesses overall (in the countries IDC surveys).

As Table 3 shows, by 2000, IDC expects close to three-quarters of computerized businesses to have demand for a Web presence. If the $35-per-year registration fee holds constant, domain registration will be a $431 million indus-

FIGURE 2
IT ENABLED BUSINESSES* WITH A HOME PAGE BY REGION 1997-2000



*Based on Businesses having at least one computer in the Organization

International Countries in ITC's ***Global IT Survey*

Source: International Data Corporation, 1998

TABLE 3
SIZE OF THE DOMAIN NAME MARKET IN PERSPECTIVE

	Businesses	Potential Demand For Web Presence (%) 1997	2000
All Businesses			
Worldwide	28,178,422	21	44
United States	7,987,423	24	42
IT-Enabled Businesses*			
Worldwide**	16,821,715	36	73
United States	5,420,236	35	61

* Businesses having at least one computer in the organization

** Countries sampled in IDC's ***Global IT Survey***

Source: International Data Corporation, 1998

try in the computerized business segment alone in 2000. Personal Web page registration is not included in this number.

Also not included in this number are two key growth factors: non-IT-enabled businesses that become IT-enabled (and subsequently demand a Web presence) and businesses in countries outside the scope of IDC's Global IT Survey. Countries outside the survey include the entire Latin American region and the Middle Eastern and African nations, which barely are in the inchoate stages of IT adoption in 1998.

The upside continues. Network Solutions reports that many companies that register domain names choose to register more than one. Some companies have registered more than 500 names in an effort to protect trademarks for individual products or to provide marketing collateral for one-time events.

Data from the quarter ending December 31, 1997, indicate that there are 1.5 registered names per customer, on average. Movies, concerts, and other public events will compose a lucrative market, according to Network Solutions spokespersons.

HOW NETWORK SOLUTIONS CAN COMMAND ITS DESTINY

Network Solutions is bolstering its position in the domain name game through a series of strategic relationships. Partnering with Internet service providers (ISPs), Network Solutions provides a direct connection to its Premier Domain Registration Service Program, which enables ISP customers to register new domain names in real time through Network Solutions' proprietary "Rwhois" registration server.

Network Solutions' also recently announced a venture stake in another registry service, Centraal, that offers registration product called Netnames. IDC sees relationships with ISPs as strategically significant because these service providers will increase their power in the IT industry as Internet connectivity becomes a necessity rather than a luxury. Linking with ISPs gives Network Solutions early mindshare with potential customers.

An even more targeted partnership is Network Solutions' relationship with Dun & Bradstreet, which bundles Network Solutions' domain name registration service with D&B's D-U-N-S number registration service. This relationship is aimed at what IDC believes will be Network Solutions' core growth market: small to midsize businesses.

WHERE IS THE DOWNSIDE?

Although IDC's forecast for domain name demand indicates that the game is Network Solutions' to lose, the company will indeed lose some parts of it.

IDC does not predict that Network Solutions will gain a huge presence in the personal Web page space if the proposed domain name .per gains approval

from the U.S. government. (Every indication is that it will.)

As .com has become the de facto standard for businesses putting out the cyber shingle, .per makes sense as the consumer domain. A company called Iperdome already has begun registering users in the .per space.

Duplicate names will also cause trouble for Network Solutions in the advent of new top-level domains. A company whose preferred level-two domain name has been taken in the .com space can switch to .web or .firm without losing much marketing clout.

The detriment the above scenarios will present to Network Solutions is difficult to quantify because, ultimately, the end user's choice in domain names comes down to personal preference.

Another encroachment on Network Solutions' business can be quantified (although the degree of quantification is almost as hard to predict as is personal taste). IDC survey data reveal that a significant percentage of companies use ISPs to host their home pages and Internet mail servers.

In some instances, doing so precludes an individual domain name registered through Network Solutions. Instead, companies receive Internet mail and host home pages through their ISP's domain.

Although IDC forecasts that the number of businesses needing a unique identifier will increase, many small businesses will get their feet wet in cyberspace through names under the domain of their ISP. Network Solutions makes money only by registering unique identifiers; thus, it receives subscription revenue for the domain name www.aol.com, but it does not receive subscription revenue for small companies that use an address like smallbusiness@aol.com to receive mail or customer feedback.

Major online services (like AOL) are not releasing statistics concerning business users, but IDC estimates as many as 30% of businesses worldwide may have relied on an ISP or online service provider's domain name to establish their presence on the Internet.

We forecast that this practice will decline through 2000 as the process of building a Web presence becomes less a matter of IT wizardry and more a commodity service that even the most unsophisticated IT user can perform.

However, many ISPs and Web hosts now offer mirroring capabilities, through which companies can rent a Web presence from a third-party provider but mirror that presence to a domain name they purchase themselves through Network Solutions.

Table 4 shows the potential business market for level-two domain name subscriptions given IDC's preliminary estimates for "ISP overlap." The forecasted number of businesses seeking an Internet presence is lower in Table 4 than in Table 3 because of ISP domain name overlap, but the data in the two tables begin to converge as the forecast progresses.

TABLE 4
BUSINESS DEMAND FOR LEVEL-TWO DOMAIN NAMES (COUNTING ISP OVERLAP) BY REGION**, 1997-2000

	1997	1998	1999	2000	1997-2000 CAGR (%)
United States	1,358,094	1,679,081	1,968,301	2,825,227	27.7
International*	2,996,247	3,649,325	4,845,809	7,650,881	36.7
Worldwide	4,354,341	5,328,406	6,814,110	10,476,108	34.0

* Based on Businesses having at least one computer in the organization

** International Countries sampled in IDC's Global IT Survey

Source: International Data Corporation, 1998

OUTLOOK

The domain name registration industry will always be a cottage industry, but it's a cottage with a great spread. As users worldwide adopt the Internet as a standard communications platform, the raw growth in subscriptions for Internet domain names will increase dramatically.

It is too soon to forecast the extent of ancillary uses for domain names — as in for trademark protection and one-time promotional functions.

Nonetheless, IDC postulates that these uses will have a positive effect on the preliminary forecasts, perhaps enough for the market for level-two domain name subscriptions to support 60% annualized growth over the forecast period.

Given this scenario, Network Solutions' revenue will at least grow an annualized 48.5% over the next five years if it can maintain 70% of its current market share through 2002.

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Batten Down the Network for E-Commerce

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September 1, 1998
IDC # 17891
Vol. 33, No. 10-11

As enterprise after enterprise makes the fateful decision to embrace the Internet as a sales channel, IS manager after IS manager comes to the realization that the problems do not end with implementing a transaction engine and integrating new data with legacy business systems.

The fact is, e-commerce can put an exceptional strain on network resources even if the enterprise has implemented a best-of-breed transaction application. Companies that do not plan ahead to deal with potential traffic surges on the network can wind up on the wrong end of a media outcry. Just ask America Online.

Further, companies that implement e-commerce solutions on the Internet platform are finding additional concerns regarding security, especially as business-to-business e-commerce grows. Security is an important component of a business-to-consumer e-commerce solution because a failure can mean lost trust and much bad publicity. However, in business-to-business e-commerce situations, a security failure can mean the compromise of long-standing (and possibly mission-critical) business partnerships, and can even lead to litigation.

This issue of *The Gray Sheet* presents findings from two recently released IDC reports on networks and security. It puts readers in the shoes of a hypothetical IS manager after he has received the word to get a corporate commerce site up and running. This newsletter points out the network hot-points in an e-commerce solution, including the following:

- **Servers** — The boxes that process and distribute data are of paramount importance in an e-commerce solution.
- **Remote Sites** — Integrating the supply chain and the channel means network tie-ins with partners' infrastructures.
- **Remote Users** — These touchpoints for commerce activity have a simple need: fast, never-fail access.
- **Enterprisewide Security** — Onsite servers, remote sites, and remote users (i.e., the public) must be regulated and protected via appropriate security solutions.

Detailed research on preparing and securing networks for e-commerce is available in the report *Lead Electronic Commerce Users: Getting the Enterprise Network Ready* (IDC #16602) and the bulletin *Adoption of Information Security Technology in the Enterprise* (IDC #17193).

THE GRAY SHEET

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WHO'S IN THE E-COMMERCE HOT SEAT? YOU!

Imagine yourself as the IS manager or CIO for a midsize or large company. You've just exited a meeting with the CEO, the senior vice president of marketing, and various other members of the executive committee. They've reached a conclusive decision: The company needs an Internet-based e-commerce solution to facilitate trade between business partners and sales to consumers.

Where do you start? Where do you focus your attention? What needs to be done today, tomorrow, next week, next month? Let's bring your specific areas of concern into focus (see Figure 1).

The illustration in Figure 1 shows the three locations that comprise the e-commerce problem: your e-commerce servers, your business partners' network, and your consumer. It also shows the "plumbing" connecting these entities. Not shown — but all-pervasive — are security solutions to regulate the flow of data through the plumbing.

THE SERVER

The first thing you will have to do to prepare your network for e-commerce is bolster the reliability of your server — or, in most cases, *servers*. Your server(s) will be hosting the essential elements of an e-commerce transaction: your catalogs of goods for sale and your commerce engine to process customer transactions.

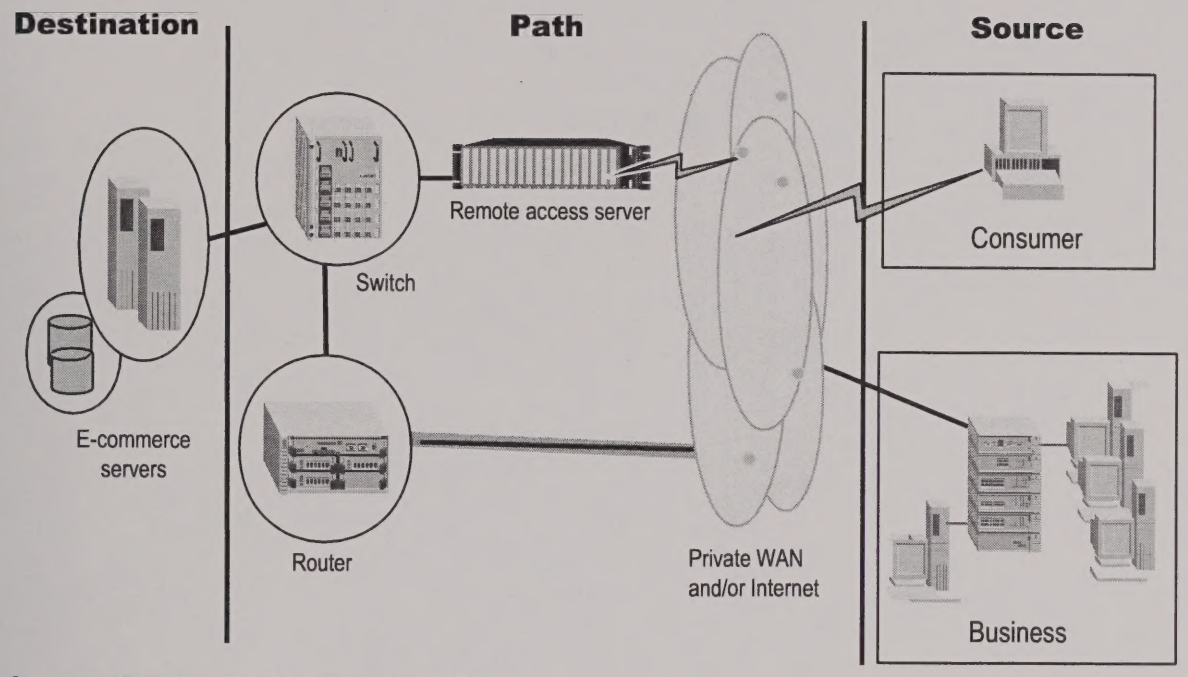
Your catalog and commerce engine may share a single server, but if your enterprise is large or if you have huge volumes of product stock keeping units (SKUs), your catalogs likely will reside on separate servers. Large enterprises with multiple business units that perform pricing and product changes independent of other business units can benefit from an e-commerce solution with a distributed server environment.

In an e-commerce scheme, the server — no matter the size or number — is the one place where things simply must not go wrong. Access to the server is the paramount concern for any network manager supporting an e-commerce thrust.

Widening and increasing the number of network roads to the server is the first step in improving server access and performance. IS organizations buy multiport 100M ethernet, gigabit ethernet (GbE), or ATM adapters for their servers and connect these servers to high-speed ports on LAN switches. (For further information on improving your LAN infrastructure, refer to the Network World Decision Support Series report *The New LAN Backbone: A Technology Road Map,* March 1998.)

Although speeding up and increasing the number of pipes that run into a server complex can offer solid performance gains, it is really just the beginning of an overall server access improvement strategy. Improving the network-to-server connection is not just about adding bandwidth and connections. In an e-commerce system in which bandwidth-hungry applications, high volumes of users and transactions, and customized partner services are the norm, the intelligent use of available bandwidth and connections is required (see Figure 2).

FIGURE 1
THE E-COMMERCE HOT SPOTS



Source: International Data Corporation, 1998

Enter Layer 3/4 LAN switches, server load balancers, Web caching systems, and advanced security systems aimed at ensuring the integrity of the e-commerce server complex.

THE SERVER SWITCH

By examining Layer 3/4 information in packet headers, LAN switches can prioritize traffic destined for or coming from the server. For example, by examining the Layer 4 TCP port number, a Layer 4 LAN switch can give priority to one type of application (e.g., WWW) over another (e.g., FTP or e-mail). Or by examining a Layer 3 source address, a LAN switch can prioritize one user (or server) over another.

This capability allows the e-commerce service provider to differentiate among partners and applications. Why is this necessary? Think of your biggest trading partners and the complexity and criticality of their transactions. It is likely that you would give them top priority when they are using your network and coming into your server. Or think of your automated order processing application. It is likely that this application gets priority over the application that offers your external users a glance at the latest marketing video stream.

SERVER LOAD BALANCING

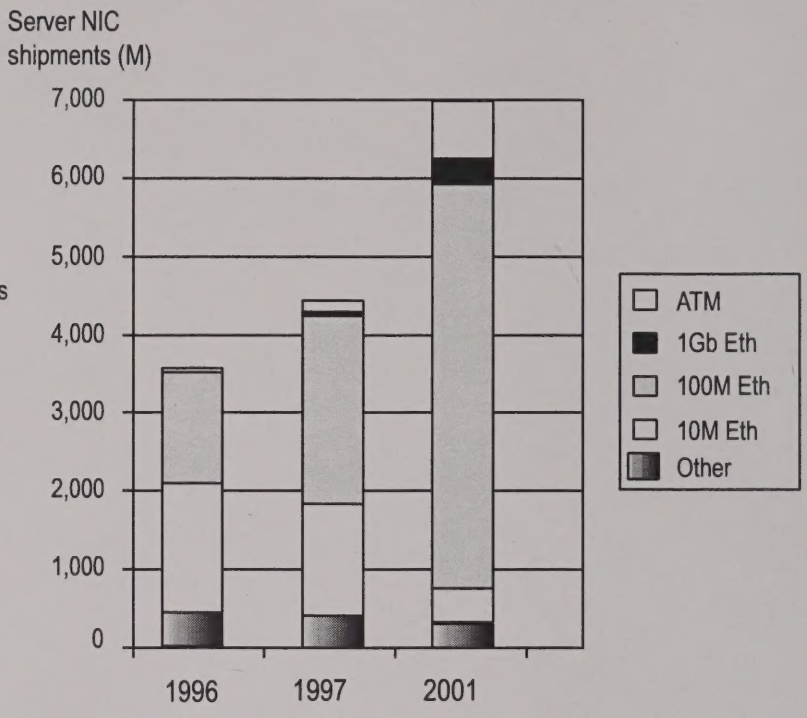
Server load balancing takes into account server readiness to process incoming requests. By knowing which server is best able to handle a request, a load balancing system directs traffic to the most ready of available servers. These load balancers are available as standalone devices (e.g., Cisco's Local Director), as add-on software (e.g., Checkpoint), or as integrated functions within a LAN switch (e.g., Alteon Networks, Arrowpoint Communications).

How does a server load balancing system do its job? The simplest of load balancers offer a straightforward round-robin scheme to direct server requests. The first request goes to server #1, the second to server #2, and so on until the end of the line of servers is reached and the load balancing system points to server #1 again. More sophisticated load balancers actually interact with the servers themselves to keep track of available server resources. With these systems, the least busy server gets the next incoming request. Obviously, this is a far more effective way of ensuring server load balancing than using a simple round-robin scheme.

Of course, the above load balancing schemes operate under one

FIGURE 2
E-COMMERCE IS DRIVING HIGHER-SPEED NETWORK CONNECTIONS

Areas to Watch:
- High-speed connections
- Shared —➤ switched links
- Intelligent switching
- "Surprise" bottlenecks
- Load balancing
- Web caching
- Customized security
- Data complexity/size



Source: International Data Corporation, 1998

grand assumption: All servers in the balanced set can handle all requests. Each server must be an exact duplicate of the other servers. The result could be a great deal of server hardware, software, information, and network connections to acquire and operate.

In an attempt to reduce the demand for duplication in a server complex, an alternative technique for distributing the load across servers is being pioneered by a company called Arrowpoint Communications. Arrowpoint's switch directs server requests by examining the destination URL, allowing an organization to split — as opposed to simply copy — its Web site across numerous servers. For larger e-commerce systems, this approach can provide significant savings in the server area.

WEB CACHING

Web caching simply offloads previously requested Web server information so that subsequent requests for the same information can be supplied by the switch and not the server itself. This practice frees up the server to perform user-specific processing and avoid processing generic banners and such. It can also provide for significant savings in network bandwidth in a distributed e-commerce scheme. When common information is cached at the edges of a network, the core of the network is freed up to support specifically requested information.

THE REMOTE SITE

So you and your largest trading partner have decided to pursue an e-commerce-enabled relationship. Although it does not require the level of integration dictated by a merger or acquisition, the ties between your two organizations will need to be streamlined, secured, adequately supported, year-2000-compliant, and, over time, enhanced (see Figure 3).

STREAMLINING THE NETWORK

First, you need to take stock of how your trading partners are set up for remote connections by answering the following questions:

- Will multiple users be leveraging the connection simultaneously?
- Will a dedicated connection be necessary, or can a dial link satisfy requirements?
- How critical is a back-up connection?

- What will be the preferred WAN service — DDS, frame relay, ISDN, or analog dial?
- What do their router networks look like — what router supplier, routing protocols, and functions are in use and available?
- How do they manage their networks — what systems are in place, and what custom features supported?
- Will the Internet be leveraged as the connecting infrastructure? Will we need to traverse a firewall (or two firewalls)?
- Will designated exchanges be prioritized in the network?
- Will encryption be necessary for all or any exchanges?
- Finally, are your business partners providing your e-commerce solution to internal users or integrating it into their own e-commerce solutions for other businesses or consumers?

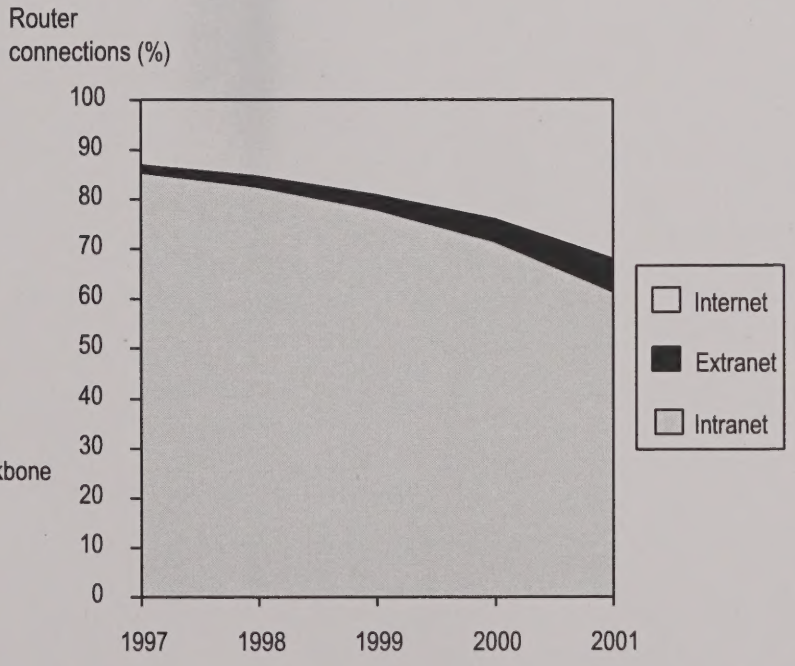
Each of these questions must be answered for each trading partner site connection. Obviously, arriving at some common connection and management scheme for all of your trading partner sites to operate within is key. This is where you leverage standardized technologies, products that provide for flexible and open configurations and easy fine-tuning, and suppliers that enable — rather than inhibit — the integration effort.

There needs to be an agreement about how to connect your two organizations. Within your individual networks, your LAN backbones (or LAN internetwork backbone) must get external users to their ultimate destination — the e-commerce server(s). Since this same LAN is likely already supporting your internal users, the local pathways are already in place. You need to make sure that these pathways are clear for the extra traffic introduced by an e-commerce system and that your LAN can handle the demands of these new e-commerce users, applications, and information. (See The Server section above.)

The Internet is viewed by many as the e-commerce saving grace for the network manager trying to reach a common networking

FIGURE 3
CONNECTING DISPARATE ENTERPRISES IS INFLUENCING TYPES OF ROUTER CONNECTIONS

Areas to Watch:
- WAN integration
- Interoperability
- Special security
- Quality of service
- Problem resolution
- Virtual private networks with the Internet as backbone



Source: International Data Corporation, 1998

ground. And the more trading partners, the more appealing the Internet becomes. Although it offers a cost-effective, ready-made pathway to a remote site, the Internet does carry with it significant risks relative to reliability, performance, and security. (For further information on leveraging the Internet as your network backbone, refer to the Network World Decision Support Series report *Using the Internet for the Corporate Virtual Private Network: Overview of Costs, Flexibility, and Management,* March 1998.)

Supporting the Remote Site

Now that you've committed to wed your e-commerce system to that of another organization, how do you ensure that things go smoothly when (not if) problems arise? Do the people in the other group call your help desk? Do they call their own? Who determines where the problem is?

Given your lack of control over the remote site — at least beyond the edge of the internal network — how do you proceed into diagnostic mode, and when do you call for help from the trading partner's own support staff? This is not a time for finger pointing; it is a time to resolve a problem as quickly and as completely as possible.

Agreeing to use some common end-user and management tools is one key. Another key is to deploy performance and service monitoring capabilities that extend as close to the end user (no matter who this is) as is practically possible. Coming to an agreement on the rules of engagement — for end users and support staff — is even more important, however. After all, the end user needs to be operating in the right manner, and the support staff needs to be doing the right thing at the right time to resolve the problem efficiently. Avoiding problems and easing their resolution through proper training of both end users and support staff is of vital importance.

E-commerce is not an area in which you handle issues as they arise. There will be more than enough issues arising without basic support issues adding to the mix.

The Remote User

Although they do not demand the sophisticated approach that a large multiuser trading partner would require, remote users may require that you pay just as much or more attention — depending on your specific e-commerce circumstances — to this segment of trading partners. The sheer volume of users, transactions, network connections, and individual security issues will weigh heavily on you, your e-commerce infrastructure, and your support staff.

The Network Access Problem

How will you accommodate remote users? Do you simply add more modem ports to your remote access concentrator? Or do you shore up your Internet connections? Do you need to be concerned with high-speed remote user connections (e.g., cable modems, DSL)? Do you even know how many end users you can expect to come to your e-commerce system (see Figure 4)?

Remote users will not have the expectations of local users with respect to response times, but they will expect to be able to connect to your system and will be aware when things are taking too long. You need to be aware of the following details relative to your e-commerce connections:

- Type (e.g., direct dial vs. Internet dial)
- Speed (e.g., 28K analog modem vs. 10Mbps cable modem)
- Volume (e.g., tens, hundreds, thousands, millions)
- Length (e.g., five-minute transactions vs. hour-long shopping excursions)
- Load (e.g., a few text records vs. video/audio streams)

All of these — often playing off one another — dictate your requirements for equipment and services that support your e-commerce thrust.

For example, if your e-commerce thrust will be supporting only 10 simultaneous users to your remote access network, and security and response time are the paramount concerns, adding modem ports to existing remote access devices may be just what the doctor ordered. However, if your user population appears to be growing dramatically, simply adding ports to your network is not the answer. Here, an Internet-backed connection scheme may be in order. But what about security and response times? This is where advanced services such as virtual private networks may be required.

End Users As Trading Partners

Chances are that remote individuals will not care about how you make your site secure or provide

for adequate performance, but they will surely need to come away from their e-commerce experience feeling safe and satisfied. Incidentally, they do not want to help you much in terms of making them feel safe and satisfied.

Therefore, you must make it easy for them to perform secure and timely exchanges. You will need to automate much of the security function from both the end-user and support staff standpoints. After all, operating and maintaining a secure e-commerce system for what could be hundreds, thousands, or even millions of users is impossible to do efficiently without the use of automation. And understanding their application requirements will enable you to deliver a network infrastructure that strikes the right balance of response times, risks, and costs.

You will also benefit from additional knowledge of your end users. In a time when everyone wants to feel special, systems that provide some level of customization for their end users have an advantage. Think of Amazon's approach to offering you specific book recommendations given your past buying preferences. This feature leads not only to greater end-user satisfaction but also to more business in the form of additional orders. Understanding the types of transactions that end users engage in helps you better tailor your e-commerce service and underlying resources to their individual needs (and business potential).

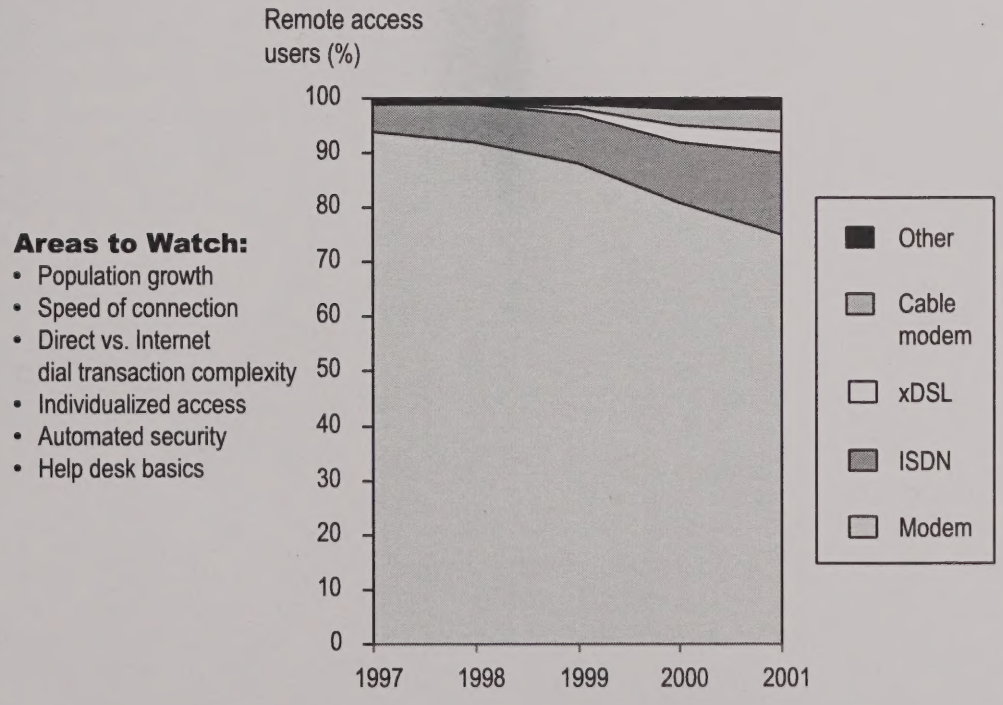
Allowing your end users to get into your system quickly, perform their transactions, and exit smoothly ensures not only good end-user experiences but also efficient use of your e-commerce system.

Supporting the Million-Node Network

Are your systems, processes, and support staff ready to handle the expected volume of users for your e-commerce system? (Do not even think about these expectations not being a target! Remember: AOL had certain expectations for its flat-rate pricing. Those expectations were blown away, along with its network and support structure.)

In dealing with individual trading partners, there will likely be many more support requirements for basic help than for hard-core technical problems. Simple configuration requests, invalid ID calls, and "How do I get access to

FIGURE 4
WHAT TYPES OF CONNECTIONS WILL REMOTE USERS (I.E., CUSTOMERS) REQUIRE?



Source: International Data Corporation, 1998

... " questions will likely be the norm. These requests do not require your best and brightest support personnel, but they do require answers. This is more a matter of staff availability than staff expertise.

Heading off requests like these can go a long way toward easing your need to hire many "easy question" handlers. Providing an e-commerce system that is easy to access and use keeps users from loading up your help desk.

Proactive monitoring of your individual users is also key to successfully supporting this volume of users. How is your population changing in raw numbers? How are transactions changing? How are users connecting to your network? How are your e-commerce applications changing to better meet their needs? Are you adding more bandwidth-intense functions to your e-commerce system?

Staying ahead of your end user is the only way to be successful in managing an e-commerce site that is geared toward the remote individual.

THE SECURITY ISSUE

All of your trading partners may be created equal, but some are a little more equal than others. Access rights need to be carefully managed in an e-commerce system. Safe compartments must be created to ensure not only that information pertaining to all trading partners is secure, but that each partner can access only information specific to its own business.

It is easy to see why trading partner information must be secure. With one security breach, that partner is gone. Worse yet would be that partner suing your organization for damages suffered as a result of that breach. Less obvious, but important nonetheless, is the need to secure the information provided to individual trading partners. Imagine your largest trading partner finding out that it did not get your best discount on products or services.

Given the highly customized nature of the information contained on an e-commerce server, it is easy to see why a security system needs to be not only robust but also very easy to administer. Without the proper tools and processes, security can become the worst and most expensive nightmare for the e-commerce project manager.

As mentioned, your more key trading partners will likely require preferential treatment in an e-commerce system. This means that they will be granted not only better network services but more advanced security services as well. It is absolutely vital to protect these exchanges — and at the same time keep an eye on performance.

Just as the underlying network needs to find a common ground, so does the security scheme. Systems and processes need to be agreed upon and subsequently strictly adhered to. There is no room for mistakes with a key trading partner. Up-front analysis and post-implementation enforcement are critical. And it certainly does not hurt to have in place security functions — add-on software or integrated device feature sets — that offer great flexibility in terms of initial configuration and on-the-fly adjustments.

Making it easy for end users to log onto the e-commerce system is one level of concern. (Bear in mind that the remote site may support many users with many different requirements.) Ensuring that the right traffic gets the right amount of attention on the network is another. Use encryption schemes that provide solid security but do not unnecessarily drain network and/or server resources. Responding to all these concerns will yield a customized security system for the larger trading partner.

How are your peers dealing with security issues? IDC's recent *Internet Security Survey* polled 300 security-savvy executives at midsize and large companies to examine their views on security throughout the enterprise.

Currently, respondents prefer to achieve Internet security via firewalls. Firewalls restrict traffic entering and leaving internal networks and control connections to the Internet. Most importantly, they support networks that operate within a set site security policy. Antivirus and firewall technologies are already well established in the enterprise. More than 93% of all sites surveyed are using firewalls, and a slightly higher percentage of sites is using antivirus products.

Widespread use of antivirus products reflects respondents' concerns about the potential damage viruses can cause to their sites. All sites ranked this threat very high, though government and health care sites are particularly concerned about viruses.

No system can be totally and completely secure without being prohibitively expensive. The actual level of security must be appropriate for the assets being

protected. When asked about the priority given to securing assets, financial data rated highest, especially in the manufacturing and financial services industries. Protection of human resources and personnel information ranked second.

When respondents were asked to rank their overall security concerns, virus prevention was foremost but data corruption and disclosure of client data were the second and third most important concerns (see Table 1). The most commonly used security products are designed to provide network protection or virus detection and correction instead of data protection. Accordingly, respondents believe the ideal security tools are network monitoring and user authentication tools rather than products to reduce data disclosure or corruption.

Thus, there is an important discrepancy between what users want and the types of solutions they're actually implementing — especially when it comes to e-commerce. As mentioned above, one security breach could cause immeasurable damage in lost business if the business of a customer or trading partner is compromised through a breach of your security.

IDC's advice to IS managers: Quantify the value of your proprietary data and your customers' data, then implement the solution that will protect that data from what you perceive to be the most damaging threat. In other words, all the virus protection in the world will not save you from data disclosure fallout; buy a data protection solution instead.

ADVICE FROM THE EXPERTS

IDC's Data Communications Program analysts offer eight pieces of advice to keep your head above water if you are the person responsible for getting an e-commerce program off the ground.

STEP #1: PUT YOUR OWN HOUSE IN ORDER

Before taking on the complexities (and risks) associated with an e-commerce practice, you must take stock of your current systems and processes. There is no better way to do this than to perform an end-user survey. Understanding where you are satisfying and letting down your current user population serves as an indicator of what you need to change. It also serves as a guide for your e-commerce approach.

For example, if your current users are satisfied with your help desk, your help desk systems and processes may be ready for the greater and even more visible challenge of supporting external users. If server access and performance are disappointments to current users, what will happen when you extend an invitation to outside partners to come and visit your servers? If your backbone is overloaded during peak usage times, what will happen when even more users attempt to traverse your network?

These are all scenarios that must be run through your e-commerce analysis. Where you have confidence in in-place processes and systems, you could pursue an e-commerce plan that leverages these areas marked "OK." Where systems and processes are already under pressure (or have already cracked), you will need to pursue one of two scenarios.

The first calls for fixing the pressured area before it can be included in your e-commerce system. For example, where server access and performance are disappointing, a server upgrade or an upgrade of the network-to-server link is needed before e-commerce functions can be added to the mix.

The second calls for setting up an alternative system/process that can be used to support external e-commerce activities. Say, for instance, the help desk is not servicing internal users adequately. In this case, a distinct and separate help desk dedicated to the e-commerce system and its end users may need to be equipped and staffed. Clearly, this may be highly redundant and wasteful. However, depending on the criticality of your e-commerce project's success, it may be necessary — at least in the short term.

STEP #2: CONSOLIDATE FROM THE BOTTOM AND MOVE UP

Common ground should be staked out for use by both internal and external users. This is especially true the further down in the system one travels. At the core of the e-commerce structure, the underlying network links and devices that serve internal needs must be leveraged for e-commerce work.

A backbone frame relay network, virtual private network services, backbone routers, remote access concentrators, and LAN switches should all form the core of both internal and external networks. The fewer dedicated lines and

TABLE 1
RANKING OF INTERNET SECURITY CONCERNS

Ranking	Concern
1	Introduction of viruses
2	Corruption or repudiation of data
3	Disclosure of client data
4	Disclosure of personnel data
5	Employee sabotage
6	Denial of service attacks
7	External hacking
8	Unwanted reconfiguration
9	Corporate espionage
10	Snooping or sniffing of networks
11	Shutdown of electronic business
12	Other

Source: IDC's Internet Security Survey, 1998

devices that support your e-commerce system, the better leverage you have to apply to financial, technical, and staff resources.

You can certainly extend higher in the e-commerce system to include development tools, databases, security systems, and servers. However, start with the basic underpinnings and work up.

STEP #3: REDUCE THE COMPONENTS IN YOUR NETWORKED INFRASTRUCTURE

No IT department succeeds by adding more boxes and more software packages and more suppliers to its existing information system. Keeping things simple requires you to reduce the number of components and suppliers you and your staff are required to oversee. With e-commerce — as with all IT projects — less is more. With e-commerce, we already know that multiple suppliers and products will be required to satisfy our requirements. Why make things more complicated by spreading ourselves thinner across more vendors and still more products?

Component reduction not only simplifies the up-front integration efforts cited by lead users as a real burden in e-commerce projects but also greatly simplifies the ongoing management effort required to operate and enhance the e-commerce system.

STEP #4: CONCENTRATE YOUR SERVER RESOURCES

Many organizations have taken steps over the last few years to bring servers together in common data centers. Whether they are called server farms, server clusters, or some other name, they ease the entire management process, enable higher performance, and allow for a more coordinated access approach.

Many advancements in networking are aimed at optimizing server access. New technologies such as gigabit ethernet and ATM allow very-high-speed pipes to be run right to a server's doorstep. And intelligent LAN switches offering traffic prioritization features and server load balancing capabilities are able to further enable high server performance by managing traffic flows to and from the server. These switches require the concentration of servers at a single location. However, for the purposes of supporting more geographically dispersed networked computing systems, some server-centric switches operate across wide-area network links.

For the global organization, these intelligent WAN switches will provide closer coupling of multiple server farms. From a management perspective, securing access, managing the database, and monitoring server performance are high priorities in an e-commerce system. Having servers in one place ensures that they will receive their rightful care and feeding by the best-equipped and most expert central support staff. If your organization does not think its e-commerce servers deserve this level of care, its commitment to e-commerce is questionable.

STEP #5: CONSTANTLY CRITIQUE YOUR REMOTE ACCESS APPROACH

Given the potential mix of users — from large trading partner sites to individual consumers — that your system will serve, it is critical for you to be on guard with respect to remote access requirements. Ask the following questions:

- How are users accessing your system?
- Who is coming in? And for how long?

- How is the volume of traffic growing?
- How is the population expanding?
- How is the "typical" transaction changing?
- How much customization is required for each remote individual or each remote site?
- How much is this month's phone bill?
- Is my Internet service provider meeting response-time commitments?
- Are my remote users and sites happy with the service this month? This week?
- How are my links holding up during peak hours?

These are just some of the questions that need to be answered on a frequent basis!

E-commerce, especially when it involves a large volume of external sites and users, throws the predictable patterns of the past out the window. If experiences to date are indicators of things to come for your implementation, your e-commerce system will likely experience a faster growth in usage and demands than you predicted. Be ready to answer the above questions at least weekly. That way, you will see next month's needed changes coming well in advance.

Step #6: Formalize Your Security Practices and Back Them Up with Investment

Security can be costly in both system investment and staff time, and putting new, solid security processes in place is never on anyone's list of fun things to do. However, with respect to e-commerce, systems, staff, and processes are absolute requirements for success. No one wants to do business across an unsecured Internet line. People do not want their e-commerce information to be exposed to the world, and e-commerce project managers do not want their systems highlighted as a hacker target in tomorrow's *Wall Street Journal.* Be prepared to answer the following questions:

- Who owns the security issue in your organization?
- Is there a dedicated security department? Does the security department have responsibility for securing information as well as the physical plant?
- Is it staffed and equipped to deal with expanding information requirements?
- Where does the IT department begin and the security department end with respect to minding information and its flow?

If you do not have hard and fast answers to the above questions, your organization needs to straighten out its information security approach. Any nonanswers or lukewarm responses will be exposed by an e-commerce thrust.

There are many solid and easy-to-use security products on the market. Many do much more than enforce security, making them even more valuable in an e-commerce environment. Yet many organizations ignore investment in this area.

Even worse, security mechanisms in in-place systems for the most part go unused. Why? Because many systems, whether in place or not, are simply too difficult to utilize effectively. And support staffs can barely keep up with current duties, let alone new security duties. An e-commerce thrust is the perfect opportunity to take stock of the security aids you have already available to you, the systems' needs to be bolstered or replaced, and the processes you need to cast (or recast) to satisfy onrushing e-commerce requirements. Remember that it takes only one bad experience (or one bad *WSJ* article) for your trading partners to abandon your system.

Step #7: Optimize E-Commerce Support

The visibility of failures of an e-commerce system combined with the often tenuous nature of trading partner relationships dictates that e-commerce system problems get top priority as well as the attention of dedicated support staff. Although many IT shops attempt to spread their support staff resources across as many technologies and information systems components as possible to ensure redundancy and maximum coverage, this strategy likely will not be successful in an e-commerce environment. The e-commerce user is not your normal user, and your e-commerce problem is not your normal problem.

Supporting an e-commerce system should be specialized support

staff who understand the customer base, the e-commerce functions offered, and the critical components in the e-commerce path. These support personnel are almost more account managers than technical repair specialists. They serve as the first line of defense in an e-commerce problem situation. Although they may not know the most about the Web application in question, the network segment under suspicion, or the server that has just gone offline, they are in the best position to offer short-term workarounds as well as guidance for the technical specialists operating behind the scenes.

Technical specialists are another concern. How much support staff are you planning to add as a result of your e-commerce thrust? Are the best candidates to support your e-commerce system currently your best technical specialists? If so, it is time to offload support duties from your internal staff.

This is where you leverage your third-party service providers. If the Internet will form your e-commerce backbone, you'll want to look at virtual private network options from Internet service providers. If support for your LAN infrastructure can be offloaded to your local networking value-added reseller, then do it. If you can invest in networking equipment that minimizes support requirements, it's time to spend some money to save money (or at least time). Maybe you will want to more aggressively pursue outsourcing services associated with older stabilized information systems, more generic hardware and software systems (e.g., PCs, servers, office systems), and/or basic operations functions (e.g., backups, software updates, help desk).

If your e-commerce system is to be a prime determinant of your organization's success in the future, bring internal resources to bear on that — and leave less critical systems and activities for outsiders. However, as you pursue an outsourcing/out-tasking strategy, you will always be required to provide internal e-commerce "specialists." After all, what is the likelihood that an outsourcing service provider or a server/software/network value-added reseller could be trusted with your present and future e-commerce system and its associated users?

Step #8: Pursue an IT Investment Model Based on ROI, Not Costs

E-commerce systems, by definition, enable more and better business. They add value but at a price. If investment in IT in your organization revolves around a cost-containment model, you will need to break new ground with respect to justifying investment in e-commerce components, development efforts, and support structure.

Once put in place, a good e-commerce system can show gains in productivity or business activity that serve to support further investment. But what if you have no proof of concept? How do you get off the ground?

The experiences — both good and bad — of others (especially competitors and similar organizations) point to the potential returns of e-commerce investment. The interviews conducted for this report prove that there are significant gains to be made in making an organization both more efficient and more effective.

Another message from leading e-commerce practitioners is to start small and show immediate gains. The faster the return, the better it will seem. Even small returns delivered rapidly show management what is possible. Think of the more successful client/server projects in your organization or in others. Most started small and worked their way forward after showing relatively minor gains. Most — if not all — of the grander long-term client/server projects that promised big gains after high levels of investment floundered and lost their momentum (and backing) well before completion.

Once your system is off the ground, make sure that you latch onto those indicators that show gains. These are the tools that will serve to deliver further investment in your e-commerce system and bring you further success in your organization.

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Perpetual Motion: Why Services and Training Markets Never Cease Growing

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August 15, 1998
IDC # 17879
Vol. 33, No. 9

Old markets, like old soldiers, never die — they just fade away. But what if there were a market that never grew old? Recent IDC theory posits that services markets, unlike some distinct product markets, will experience perpetual, cyclical growth.

Product markets suffer an obvious limiting element: Theoretically, every human being could own a unit of a given product and the market then would be saturated — with all further sales dependent on life cycles, upgrades, and duplicate purchases.

In consumer products, for instance, TVs and radios have penetrated virtually every household in the United States. Most homes have more than one TV and radio, and years of competition have made these items commodities. These product markets will not experience strong growth unless the industry creates a paradigm shift. (e.g., Digital TVs may stimulate new demand as analog users upgrade.)

The same fate may await PCs. In the U.S. business market, PCs already outnumber desk workers, and the U.S. market overall (consumers and business) is not growing at the speed it enjoyed just two or three years ago. IDC forecasts the five-year revenue growth for the U.S. PC market to be about 6%, compounded annually. This growth rate is down two points from the five-year compounded rate IDC forecasted a year earlier.

Although the *worldwide* PC market has much room left to grow, price erosion created by stiff competition in the U.S. market has tightened margins and created a commodity-like atmosphere. The maturation of the worldwide PC market still may be more than five years away, but it is not outlandish to think this market will resemble the market for TVs and radios eventually.

So how do service markets differ from product markets, and what makes them so great? The simple answer is the human element, and this issue of *The Gray Sheet* will explain just how this element alters the traditional market maturation cycle.

FOREVER IS A LONG TIME

Economists will be quick (and right) to point out that there's no such thing as a perpetually growing market — that purchasers of

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services have a collective monetary limit they are able to spend. The percentage of the theoretical worldwide operating budget that corporate decision makers can spend on services is finite.

However, unlike product offerings — which reach a saturation point — services offerings constantly change to meet demand. The business model of a service provider does not change — only the content changes.

The IT training industry is a key example. Several years ago, client-server networking certification (e.g., Novell certification) was a great opportunity for training vendors. Although Novell certification programs are still in some demand, other training offerings (like Windows NT certification and HTML programming) have supplanted Novell certification training. However, the customers for IT training (usually IS managers and staff) are only human; they change jobs, receive promotions, or hire new staff. Each of these circumstances can create demand for new training to bring new employees up to speed.

Consider the following scenario: A midsize company elects to implement a client-server network on the Novell platform. The company pays to train several key members of its IS staff. The IS folks become Novell certified, implement the network, and promptly quit to take higher-paying positions with other companies that need Novell network managers. The midsize company in this example counters by promoting and training several more members of its staff. Two years later, this same company decides it needs a Web presence, so it trains its network managers in Web page development too. Depending on the complexity of the new Web page development and maintenance, the network managers may need to hire or train more people to keep up the network while they manage the midsize company's Web page.

The above is a boon for IT training and IT services companies, which continue to grow as new technologies spur demand for more IT workers. (Ironically, even older technologies are spurring demand for training and services. The Year 2000 issue — and the subsequent need for COBOL programmers — is a notable case in point.)

Make the Most of the Fortuitous Situation

Although the climate for IT services firms is inviting, services strategists must recognize the market's dynamics to maximize profits. If IT services firms are to effectively develop services strategies that will meet the changing needs of corporate clients, market planners must be able to project forward with a reasoned framework of future demand patterns and primary change drivers that will create the next industry opportunity.

Demand and opportunity are created by some form of change within a client organization. An explanation on the difficulties

of predicting change can be drawn on a personal level by comparing the difference between banking and legal fees. In the case of banking fees, a person can look at their past banking fees and develop some basis for predicting the following year's expenditure. In the same way, corporations can look at their general cost expenditures, such as electricity and telephone, and determine what their requirements will be for the near future. Conversely, with legal fees, a person generally incurs significant legal costs only when some aspect of their life changes. Therefore, past trends and historical precedents are not necessarily a reasonable leading indicator of future activity or expenditure. Similarly, with corporations, it is difficult for IT services firms to predict what environmental changes will occur within companies and what effect these changes will have on the requirements of their clients.

What are the primary factors that drive change in an enterprise?

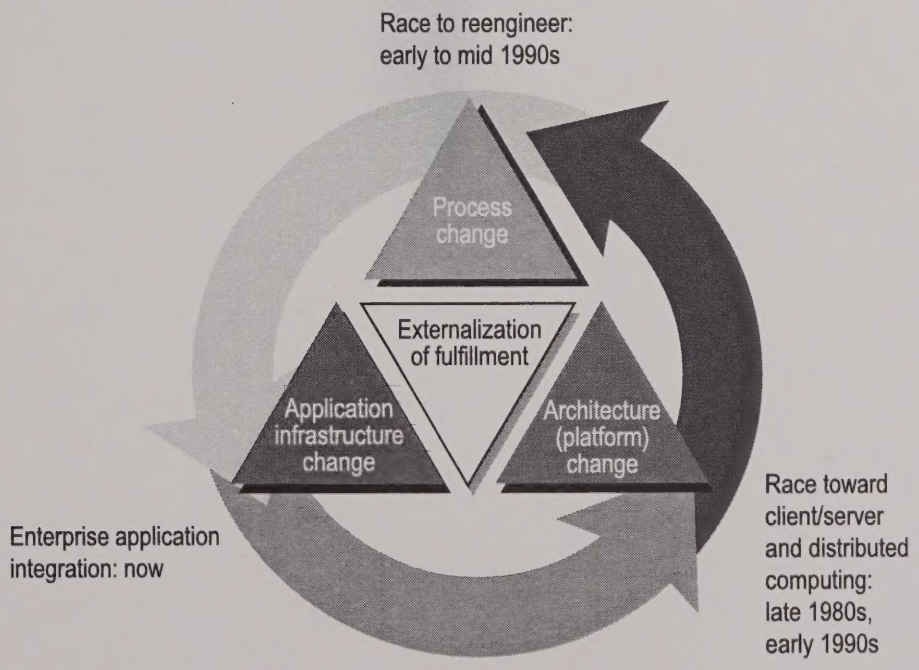
- Process change
- Application infrastructure change
- Architecture or platform change

These three factors that drive change lead to a fourth — and key — factor that directly correlates to the success of services organizations. IDC calls this factor "externalization of fulfillment," or more directly, the propensity of a client to spend money on third party services rather than in-house staff to meet a need.

IDC has observed that at any one point in time, process change, application infrastructure change, or architecture (platform) change will act as the dominant driver of change within the market — meaning one of the above three factors acts as the primary generator of revenue opportunity in the market. However, the dominant driver is not static in nature and will shift over time.

Figure 1 shows the model for drivers in the service market, with real examples of changes that have driven the market in the past.

FIGURE 1
CHANGE DRIVER DOMINANCE


Race to reengineer:
early to mid 1990s
Process change
Externalization of fulfillment
Application infrastructure change
Architecture (platform) change
Enterprise application integration: now
Race toward client/server and distributed computing: late 1980s, early 1990s

Source: International Data Corporation, 1998

What History Has Taught Us

Corporate America led a rush toward client-server and distributed computing (late 1980s to early 1990s). In the late 1980s and early 1990s, distributed systems and client-server computing emerged in the market to create significant changes in the architecture and platform infrastructure of firms (architecture/platform change).

As firms moved to migrate from their legacy systems to distributed computing and client-server environments, this architectural change, in turn, drove changes in the way business processes could function and in the types of application infrastructure being used by firms — and to some extent influenced firms to externalize these efforts to outside services firms. As a result, architecture/platform change became the focal point of IT services spending, drove changes in other areas, and created specific market opportunity.

Following the migration to client-server and distributed computing in the mid 1990s, business process reengineering (BPR) took the market by storm. The market crystallized under the term BPR, and corporations became increasingly interested in reengineering their enterprise (Process Change).

As market interest in reengineering organizations expanded, a large portion of overall spending in a BPR engagement could be directly linked to the specific IT applications and the types of architecture required to support the new processes. As a result, process change became the focal point of IT services spending, drove changes in other areas, and created specific revenue and growth opportunities.

By 1996, the requirement for BPR as a discrete service waned, as reengineering became a skill set that was increasingly integrated into most large-scale systems integration engagements. Reengineering capability was bundled into a new wave of enterprise investment, focused on implementation of enterprise resource planning (ERP) applications and a new concept described as package-centric reengineering. As a result, process change was no longer the focal point of most organizations.

Rather, the central focus of enterprise investment shifted to concentrate on application infrastructure change facilitated through ERP products, such as SAP, Baan, and PeopleSoft. With application infrastructure change shaping the market, firms moved to have these new ERP tools and products implemented into their organizations.

As adoption of the new application infrastructure occurred, there was a resulting requirement to invest in changing the architecture/platform on which the applications ran and a need to change the overall organizational processes within a company in order to mesh them with the new software applications. As a result, application infrastructure change became the focal point of IT services spending, drove change in the other two areas, and created specific market growth opportunities.

Using the Predictive Market Model to Identify Emerging IT Training Opportunities

The determination of patterns of change outlined in Figure 1 clearly indicates that not only is the market cyclical in nature but the pattern of change is predictable. By focusing on the three primary market drivers of change, it is possible to locate the principal growth drivers for the future, apply them to specific areas of the services market, and create an invaluable guide for market planners and strategists.

IDC postulates that the market drivers of change maintain a pattern of 24- to 36-month cycles of evolution. Based on this hypothesis, it is possible to develop a predictive market model that can be usefully employed to project important market shifts in the future IT services industry. Based on this model, the market has witnessed architecture change with the client-server market (late 1980s to early 1990s), process change with business process reengineering (mid-1990s), and application infrastructure change through enterprise application integration (now).

Following the cyclical pattern of its predictive model through the late 1990s, IDC predicts the driver to create market opportunity will focus on dramatic

change around architectures (platforms). Based on the current market focus around the implementation and use of the Internet/intranet, it is clear that the new market transition will concentrate on the Internet and electronic commerce platforms as the emerging wave of market opportunity and growth (see Figure 2).

Building on the above prediction, there is already clear evidence of a shift in corporate spending toward the use of intranets as a primary computing platform in much the same way as client-server and distributed computing took hold of the market in the late 1980s to the early 1990s. In addition, as the presence of the Internet is further established in the market, there is a drive in the market toward changes in application infrastructure and business processes that will enable client organizations to function differently in the market.

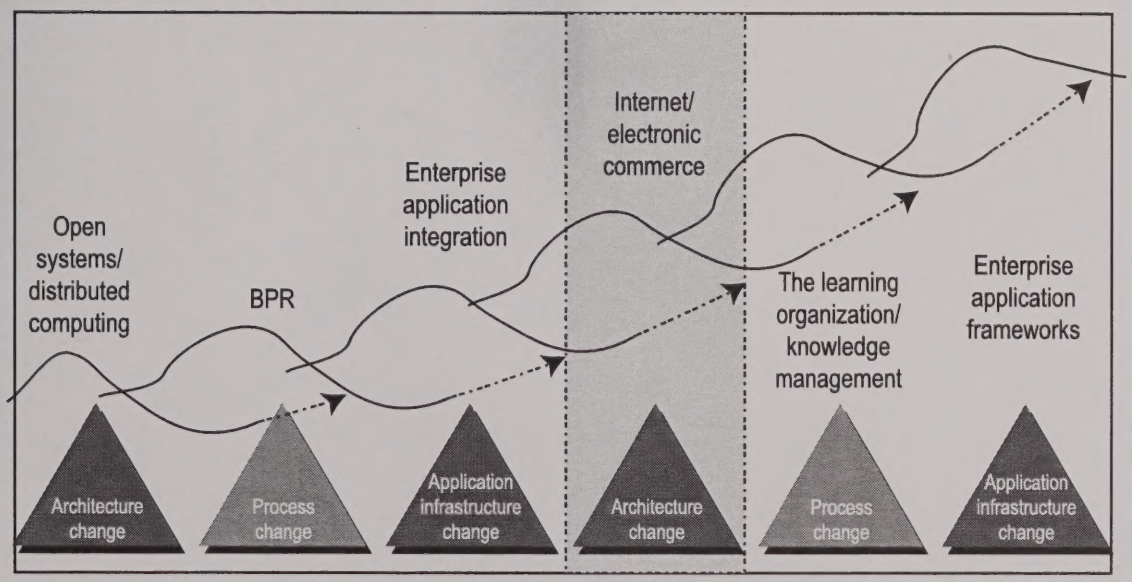
MARKET CHANGE + THE INTERNET = ROSY TRAINING FORECASTS

One service that reaps tremendous benefits from changes in the IT industry (and from the current platform change to the Internet in particular) is IT training. Not only is the Internet creating demand for training to implement and manage this new architecture, it is providing training companies efficient new ways to distribute their services.

From each of the shifts emerging in the overall services market structure, there are resulting IT education and training opportunities. For example, the massive technology migration that took place as corporations moved from mainframe to client/server environments and the resulting new applications developed to run over the client/server platform created a significant long-term need in the IT education and training services industry to help large groups of employees be technically updated and re-skilled.

Another revenue opportunity for firms active in the IT training market is the requirement of corporations to develop the Internet/intranet skill sets required to implement the

FIGURE 2
PAST AND FUTURE CYCLES IN THE EVOLUTION OF THE IT SERVICES MARKET (INTERNET/ELECTRONIC COMMERCE AS THE CURRENT WAVE)



Source: International Data Corporation, 1998

actual solutions in the market. Examples are specific training courses and education solutions designed to supply the corporate market with the training on how to design, develop, install, manage, or use this rapidly evolving architecture.

Table 1 shows the past and forecasted growth of the services market by region.

Opportunities abound for teaching skills-transfer learning, like HTML scripting and Java programming because these programming techniques are core to developing home pages and electronic storefronts. Opportunities also abound for teaching knowledge-transfer skills associated with Internet marketing and commerce because the Internet medium presents a host of new challenges and opportunities with regard to business practices.

Practice What You Teach

Currently, the common view of training sees an employee stopping their job to attend a classroom event or take self-paced training to gain the knowledge they need. However, the rapid churn of technology and the continuous introduction of new information into employee environments require employees to be continually updated and re-skilled to be able to properly perform their jobs. As firms face the need to continually update the knowledge levels of employees, there has been a corresponding need to change the way content is delivered.

The disintermediation process is anticipated to be one of the most profound results of the emerging market shift toward the increased use of the Internet and the implementation of electronic commerce. Disintermediation literally means the removal of intermediaries in a particular process. As it relates to the Internet and the services industry, it refers to the potential removal of intermediary channels or their bricks and mortar (real estate) to exist when delivering services to a customer.

The process of disintermediation caused by the advent of distance learning and online training will have a direct impact on third-party IT training firms' current position as the primary intermediary for delivering content to the market. The continuous introduction of increasingly robust and interactive Web-based training solutions will enable product vendors, who need to have the market properly skilled, and customers, who need to ensure that employees have the required skill sets, to leverage emerging alternative formats

Table 1
Discrete Worldwide IT Training And Education Services Revenues* By Region, 1996–2002 ($M)

Region	1996	1997	1998	1999	2000	2001	2002	1997–2002 CAGR (%)
United States	6,259	7,362	8,379	9,434	10,553	11,615	12,687	11.5
Western Europe	4,639	5,135	5,628	6,173	6,886	7,673	8,486	10.6
Japan	2,304	2,432	2,581	2,738	2,867	2,998	3,160	5.4
Asia/ Pacific	518	612	726	842	968	1,079	1,190	14.2
Canada	409	479	554	645	746	860	998	15.8
Latin America	358	443	555	670	835	974	1,136	20.7
ROW	243	279	338	414	500	585	674	19.3
Total	14,730	16,742	18,761	20,916	23,355	25,784	28,331	11.1

*Note: Discrete revenues do not include training revenues bundled with other types of consulting or services projects.

Source: International Data Corporation, 1998

Intellectual Capital in the Internet Age: A Global Power Struggle?

Corporate America is embracing Web-based training mechanisms with vigor because they can reduce overhead costs associated with training and can reduce opportunity costs by keeping workers at their desks longer. However, the benefits and power associated with the instant and pervasive distribution of knowledge has not been lost on another segment of U.S. society responsible for conveying information: U.S. educators.

Educators, politicians, and much of the general public have praised the Internet for its ability to bring education to the geographically and financially challenged. The Internet is bringing change to the way many Americans think about learning, and the changes are coming from all fronts. In Colonial America, higher education was a privilege afforded only to sons of the oligarchy. Now, a search on the topic "distance learning programs" will yield tens of thousands of distance learning programs from colleges, high schools, grade schools, corporations, and non-profit organizations — all eager to provide education for the masses.

Proponents of Internet-based education and distance learning pose the mildly xenophobic argument that the United States could lose its status as a favored nation economically if other nations adopt Internet-based learning and successfully leverage it to build intellectual capital.

Utah governor Michael Leavitt, a founder of a distance learning project called Western Governors' University (WGU), refuted critics of his project with a quote in CIO Magazine that plays to that xenophobia:

"The window is wide open for any group or for that matter any collaboration of people...to design and remake the educational delivery system.... The race is on. And the outcome is going to change not just higher education but people around the globe."

Indeed, the argument may hold water. IDC research finds at least some relationship between availability of education and nations' respective abilities to participate in the information society. Six of the overall top ten nations ranked in IDC's Information Society Index* *ranked in the top ten for tertiary education (see Table 2).*

* *The Information Society Index* ranks 55 of the world's more industrialized nations on their ability to absorb and benefit from information technology — in short, it measures their ability to create and participate in the world's information society.

as fast and effective means of meeting training needs.

Web-based training will enable IT vendors to increase their share of the IT training market by expanding their direct training activities. This medium will allow product vendors to be in control of the learning environment and not count on third parties to deliver training for them. Three factors that are drawing vendors to the direct approach are the revenue opportunity, the ability to ensure the quality of training that customers receive, and the ability to have more direct contact. (e.g., If the customer wants to go direct, we'll take that business!)

As Web-based training formats are adopted, there is the potential that many vendors and customers will not see as much need for traditional in-class IT training (i.e., at a supplier site) to meet their education and training requirements. In order to maintain market share, third-party training firms will have to differentiate their offerings by providing value-added training services and tools and by delivering only top-quality training offerings.

Finding the Holy Grail

So how will successful services and training companies reap the benefits of a market that consistently changes its demand as technologies and business process change? In a phrase, they must be aware.

Services companies, including training companies, will be

TABLE 2
DOES EDUCATION INFRASTRUCTURE CORRELATE TO INFORMATION SOCIETY PARTICIPATION?

Does a strong, efficient educational system drive an advanced acceptance of the information society and the tools to build it, or does an acceptance of IT tools make it easier for a society to develop an advanced educational system?

Colorado governor Roy Romer, also quoted in *CIO Magazine* backing WGU, believes in the former of the above philosophies. He states:

"Skills, knowledge and new ideas are going to drive the economies of the world. In fact, [they're] going to drive the lives of most people."

Rank	1997 ISI Tertiary Education Score		1997 ISI Total Score	
1	**Canada**	200	**United States**	4,833
2	**United States**	162	**Finland**	3,591
3	**Finland**	126	Denmark	3,476
4	**New Zealand**	116	Sweden	3,442
5	**Norway**	108	**Norway**	3,423
6	France	100	**Netherlands**	3,299
7	Korea	96	Switzerland	3,288
8	**Netherlands**	90	**Canada**	3,278
9	Russia	90	**New Zealand**	3,249
10	Austria	86	United Kingdom	3,244

Source: International Data Corporation, 1998

exposed to recurring battles for market share as each process, architecture, or application change hits the market. Successful companies will anticipate the changes and react to them, leveraging existing market share from prior successes. If they do not address the changes in demand, they will leave themselves exposed to new and/or existing competition.

The dance session in the courtship of IT training and services business is a marathon, and players can join or leave the floor at the beginning of each new song.

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Small Businesses: Are They Ready for E-Commerce?

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August 1, 1998
IDC # 17221
Vol. 33, No. 8

Want to make an Internet commerce solutions vendor's eyes go starry? Mention the small business segment. In 1997, while many of the United States' corporate behemoths were spending hundreds of thousands of dollars each to build storefronts on the World Wide Web, many small businesses were plugging in their modems for the first time.

But if time heals all wounds, the Internet is Neosporin for the small business segment's IT acceptance. Although the small business segment has not displayed a fear of IT (more than 75% own PCs), its hunger for conducting commerce on the 'Net — and the opportunity for solutions providers — is remarkable. This segment sees Internet commerce as an equalizer with larger competitors, and buying, selling, and promoting products are primary motivating factors behind small business's Internet acceptance.

Only about 16% of current Internet-using small businesses have the ability to take transactions through the World Wide Web, and IDC expects this to grow to 25% by next year, based on survey results. However, 36% of *prospective* small business Internet users plan to use the medium for commerce, and if these prospective Internet users get wired and get a commerce site up and running, the installed base of small businesses that conduct e-commerce will be significantly larger.

Internet commerce vendors and ISPs have picked up on this trend. Open Market began offering a Windows NT version of its successful Transact software earlier this year, and iCat began offering its popular e-commerce software through a service model — in the same manner as many ISPs and Web hosting services. The theories behind these moves are simple: Open Market, through the NT channel, hopes to penetrate smaller businesses that likely don't have expensive Unix platforms. iCat thinks an equipment-free service model is an even more appealing choice for small businesses.

Even traditional IT vendors are seeing an entree to the Internet commerce market through the low-end small business segment. Compaq released its Club Web offering earlier this year, which packages offerings from a variety of vendors and aims to take the complexity out of buying an end-to-end Internet commerce solution.

IDC recently undertook an extensive survey of small businesses to determine what role the Internet played in their IS and business strategies (see *U.S. Small*

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Businesses on the Internet, IDC #16319, June 1998). This issue of *The Gray Sheet* examines some of the findings and illuminates small business trends toward e-commerce.

Important findings include the following:

- The percentage of small businesses that use the Internet doubled in 1997.
- Home page adoption grew more than 200% from yearend 1996 to yearend 1997 in the small business market.
- Nearly one-fourth of small businesses that used the Internet purchased a product through it in 1997.
- Only 16% of online small businesses have sold a product on the Internet, but significantly more plan to do so.

GETTING TO KNOW THE SMALL BUSINESS

What are the characteristics of small businesses in the United States?

IDC defines the small business market as the group of enterprises employing fewer than 100 people and excluding home offices. For research purposes, only the primary location qualifies to answer questions about IT acceptance. IDC surveys only owners, presidents, or office managers to ensure qualified responses.

There were 7.2 million small businesses in the United States in 1997 (given the qualifications above), and the number of small businesses is growing slightly (2% per year) through the IDC forecast period, which ends in 2001. In 1997, 78% of small businesses owned at least one PC, and 39% had access to the Internet (see Table 1).

Small businesses jumped on the Internet bandwagon with aplomb in 1997. The raw number of wired small businesses more than doubled, and the percentage of all small businesses with Internet connectivity *nearly* doubled. (Growth in the raw number does not match the growth in penetration because of the 2% growth in the overall number of small businesses.)

Small businesses that have adopted the Internet enjoy higher revenues and faster growth than their counterparts that have not adopted the Internet. The average yearly revenue for all small businesses was about $2.7 million. Small businesses that used the Internet averaged about $3.8 million in annual revenue in 1997.

Internet-using small businesses are generally larger than the average small business. Not surprisingly, the telecommunications needs for Internet-using small businesses are greater than the average small business, as well. Part of this increased demand is because Internet-using small businesses have more employees, but also because Internet use puts a greater demand on telecommunications resources.

Internet-using small businesses averaged more than seven phone lines per business and spent more than $700 per month on telephone services. The total small-business population averaged about five lines per business and $500 per month in phone charges (see Tables 2 and 3).

TABLE 1
USE OF PERSONAL COMPUTERS AND THE INTERNET AMONG U.S. SMALL BUSINESSES, 1996–2001

	1996	1997	1998	1999	2000	2001	1997–2001 CAGR
Total SBs (000)	7,065	7,245	7,382	7,531	7,684	7,842	2%
PC-owning SBs (000)	5,200	5,651	5,900	6,100	6,355	6,552	4%
Internet-using SBs (000)	1,392	2,814	3,240	3,602	3,940	4,272	11%
PC penetration among SBs (%)	74	78	80	81	83	84	
Internet penetration among SBs (%)	20	39	44	48	51	54	

Source: International Data Corporation, 1998

The Microsoft Windows environment is dominant in the small business environment. Internet-using small businesses show a tendency toward multiple platforms — with strong Windows acceptance and a greater use of Macintosh and Unix platforms than the general small business population (see Table 4).

Small businesses have been slow to adopt local area networking. About 17% of the total small business population have a LAN.

Only 22.5% of PC-using small businesses have a LAN; however, the penetration rate is greater in Internet-using small businesses, where 31% operate a LAN. The heretofore indifference toward local area networking is further

TABLE 2
NUMBER OF TELEPHONE LINES INSTALLED AMONG U.S. SMALL BUSINESS INTERNET USERS, 1997 (%)

	All SBs (<100 Employees)	SB Internet Users
1 line	18.0	5.9
2–3 lines	36.3	33.1
4–5 lines	22.4	23.9
6–9 lines	13.9	19.1
10–19 lines	6.5	12.6
20–49 lines	2.2	3.8
50 or more lines	0.7	1.6
Mean number of lines	4.98	7.06
N =	1,011	411

Source: IDC/LINK's *U.S. Small Business Survey,* 1997

TABLE 3
AVERAGE MONTHLY TELEPHONE BILL OF U.S. SMALL BUSINESS INTERNET USERS, 1997 (%)

	All SBs (<100 Employees)	SB Internet Users
Less than $75	11.6	6.4
$75–149	19.2	15.0
$150–199	13.6	11.1
$200–499	26.7	27.5
$500–999	13.6	17.6
$1,000 or more	11.9	19.8
No answer	3.3	2.4
Mean ($)	520	733
N =	1,011	411

Source: IDC/LINK's *U.S. Small Business Survey,* 1997

TABLE 4

OPERATING SYSTEMS INSTALLED AMONG U.S. SMALL BUSINESS INTERNET USERS, 1997 (%)

	PC-Owning SBs (<100 Employees)	SB Internet Users
Any Windows	80.9	87.4
Windows 3.1/3.11	42.3	42.1
Windows 95	52.5	65.8
MS DOS/PC DOS	52.5	47.5
Apple Macintosh	10.2	14.2
Windows NT	8.0	9.6
Unix	4.2	5.4
OS/2	0.8	0.8
Other	4.6	5.4
No answer	3.0	1.8
N =	826	411

Source: IDC/LINK's *U.S. Small Business Survey,* 1997

evidenced by the lack of server adoption among small businesses. Only 12% of all small businesses, 14% of PC-enabled small businesses, and 19% of Internet-using small businesses have a dedicated server to run the network (see Figure 1). IDC expects that a fair portion of small business LANs are created by connecting traditional desktop PCs.

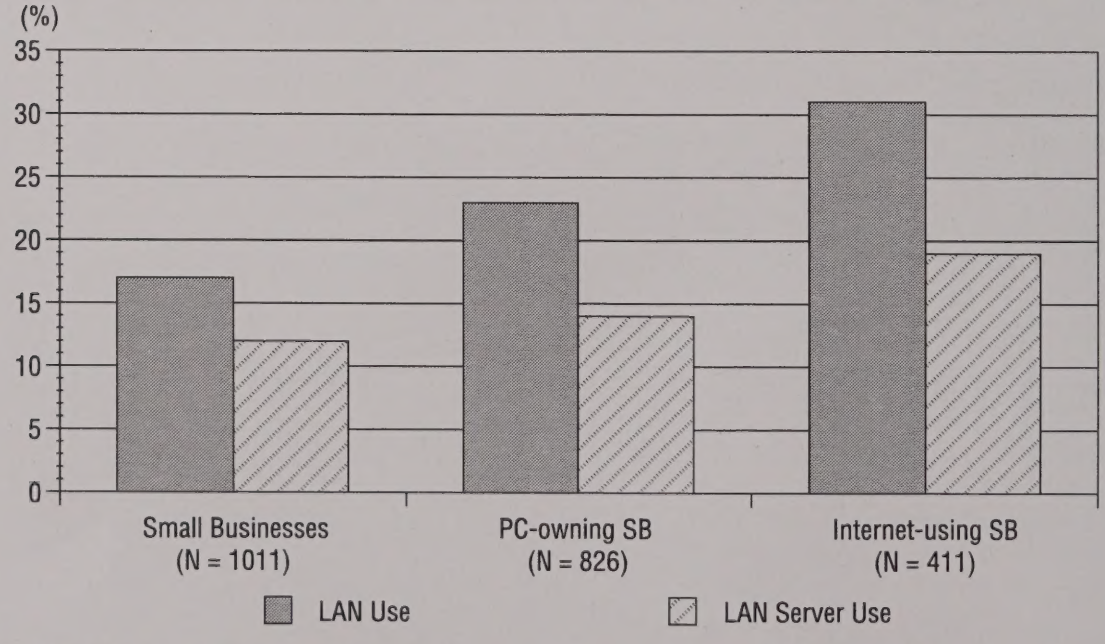
IDC expects the LAN market to benefit from the growing adoption of the Internet in the small business segment because small businesses will seek more efficient ways to bring Internet access to multiple users. (Many use dial-up connections for each PC's Internet connectivity.)

HOW ARE SMALL BUSINESSES USING THE INTERNET AND HOW DO THEY WANT TO?

As noted in Table 1 in this newsletter, 2.8 million small businesses had Internet access in

FIGURE 1

LAN AND LAN SERVER USE AMONG U.S. SMALL BUSINESSES, 1997



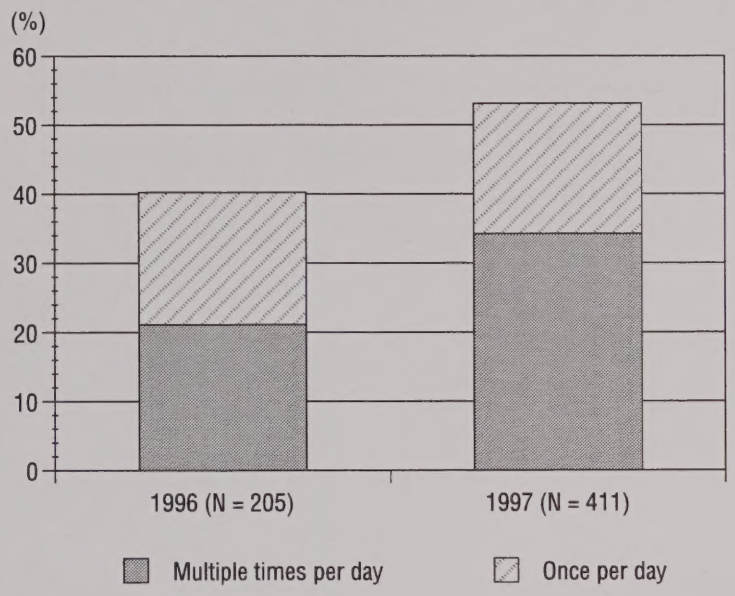
Source: IDC/LINK's *U.S. Small Business Survey,* 1997

1997. The degree to which each business uses the Internet can differ dramatically, however. Internet use, as defined in IDC's survey, can be as little as accessing the Internet once a month — or it can be as advanced as conducting electronic transactions.

Frequency and Methods of Access

Not only has the number of small businesses that use the Internet grown significantly over the past year, but the importance of the Internet as a business resource to those who use it has increased significantly too. Small businesses are broadening the number of Internet applications they use, and, consequently, they are online more frequently. The percentage of Internet-enabled small businesses that report being online at least once per day has risen from 40.2% in 1996 to 53.1% in 1997. Those that access the Internet at least twice each day rose from 21.1% in 1996 to 34.2% in 1997 (see Figure 2).

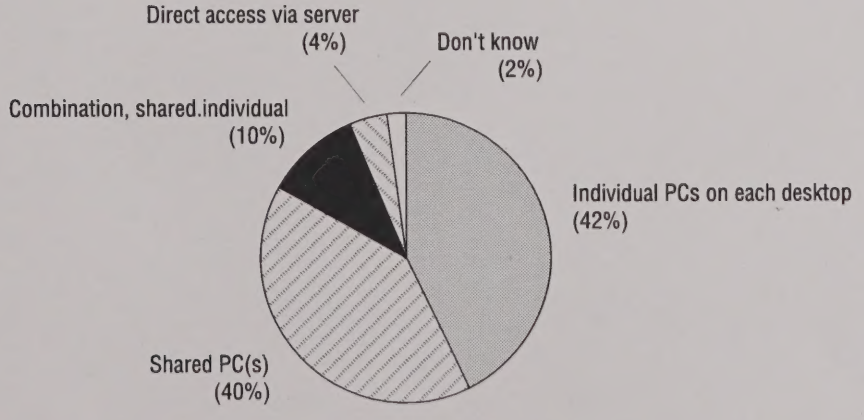
Figure 2
Frequency of Internet Access Among U.S. Small Businesses, 1996 and 1997



Source: IDC/LINK's *U.S. Small Business Survey,* 1996 and 1997

As discussed in the previous section, the increased frequency with which small businesses access the Internet is expected to have important ramifications for networking equipment providers, ISPs, and telecommunication companies. As contention for access to the Internet increases in small office environments, these businesses will move away from the predominant method of Internet access — a single PC that is shared by workers — to LAN-based methods of Internet access (see Figure 3). For many small businesses, this will mean implementing a LAN, as LAN

Figure 3
Methods of Internet Access Among U.S. Small Businesses, 1997



Source: International Data Corporation, 1998

TABLE 5

ONLINE SERVICE PROVIDERS USED BY U.S. SMALL BUSINESSES, 1997 (%)

AOL	56.30
CompuServe	11.90
Microsoft Network	8
Prodigy	5.90
AT&T	5.60
Network MCI	1.70
Other	31.30
N =	306

Note: Multiple responses allowed
Source: International Data Corporation, 1998

implementation lags far behind PC and Internet usage in the small business market. ISPs and telecommunication companies should see a rise in use of high-bandwidth dedicated access to the Internet as small businesses look for more bandwidth to support shared, LAN-based access to the Internet.

In 1997, 64% of businesses used modems with speeds of 28.8Kbps or higher.

Roughly 30% of all small businesses use an online service; in fact, some small businesses use more than one. America Online enjoys the dominant market share for online service use among small businesses (see Table 5). Although IDC suspects some small businesses may access the Internet through an ISP and an online service, we believe the online service may be the primary means for Internet access for many small businesses.

CYBERSAVIOR? THE INTERNET AS A SMALL BUSINESS TOOL

Many small businesses are turning to the Internet in an effort to level the playing field with larger business rivals. Indeed, the Internet's worldwide scope and 24 × 7 availability has enabled companies like Amazon.com to strip low-hanging market share from established competitors in the physical world.

Although the buzzword surrounding the Internet in the past 12 months has been e-commerce — and Dell Computer, Amazon.com, and others have achieved celebrity status from commerce exploits — the Internet offers myriad ways to promote business and stimulate sales. In some ways, the Internet has become a mainstay in the small business tool shed.

More than 75% of companies with Internet access use e-mail, and IDC expects e-mail penetration to approach 80% by the end of 1998. E-mail's ubiquity as a communications platform is not unique to the small business segment, as nearly all consumer Internet users and large business users cite e-mail as their number one Internet application. E-mail is a prime motivating factor for small businesses that do not yet use the Internet to come online. More than 60% of survey respondents who expected to get Internet access within 12 months planned to use e-mail.

Table 6 *(see page 8)* shows the uses and expected uses that small businesses have found for the Internet.

Although e-mail was the predominate application that small businesses performed on the Internet, survey respondents cited the Internet as a valuable tool for gaining industry information (44%) and general business news (42%).

Despite the hype it enjoys in the general press and among larger businesses, Internet commerce has yet to take off in the small business segment. Only 16% of small businesses that use the Internet (and about 5% of small businesses overall) are selling products or taking sales leads over the Internet. However, nearly 25% of Internet-using small businesses plan to take sales or leads through the Internet within the next year. Based on survey responses, this is the fastest growing use for the Internet among small businesses.

Among small businesses that do not have Internet access — but are planning on getting it within 12 months — the desire to sell goods is strong. Thirty-six percent of prospective Internet users intend to sell goods when they get online.

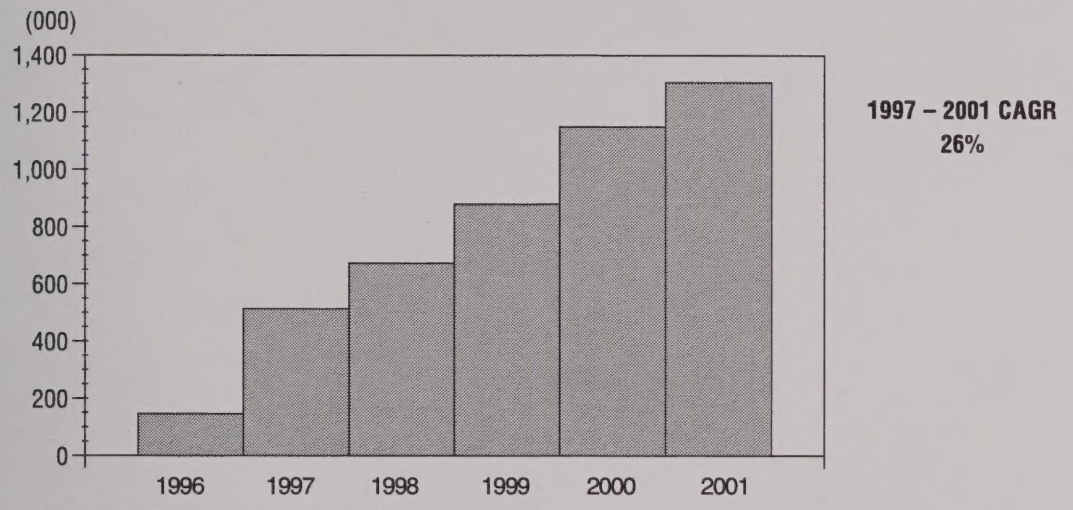
Even more popular than selling goods online is buying goods online in the small business segment. Nearly 24% of current

Internet-using small businesses have made purchases online, and based on survey results IDC expects 30% of these businesses will do so within 12 months. Among small businesses that are not online yet, but will be within 12 months, 37% expect to do some online buying.

Another indicator of the small business market's degree of Internet savvy is its use of home pages. Home page growth exploded among small businesses in 1997. Only 2% of small businesses had home pages at yearend 1996; 7% did in 1997. IDC expects the adoption rate of home pages to continue to grow at about 26% per year through 2001 (see Figure 4).

The home page is also the most popular promotional activity the small business segment has found for the Internet so far (see Figure 5). Only about 15% of

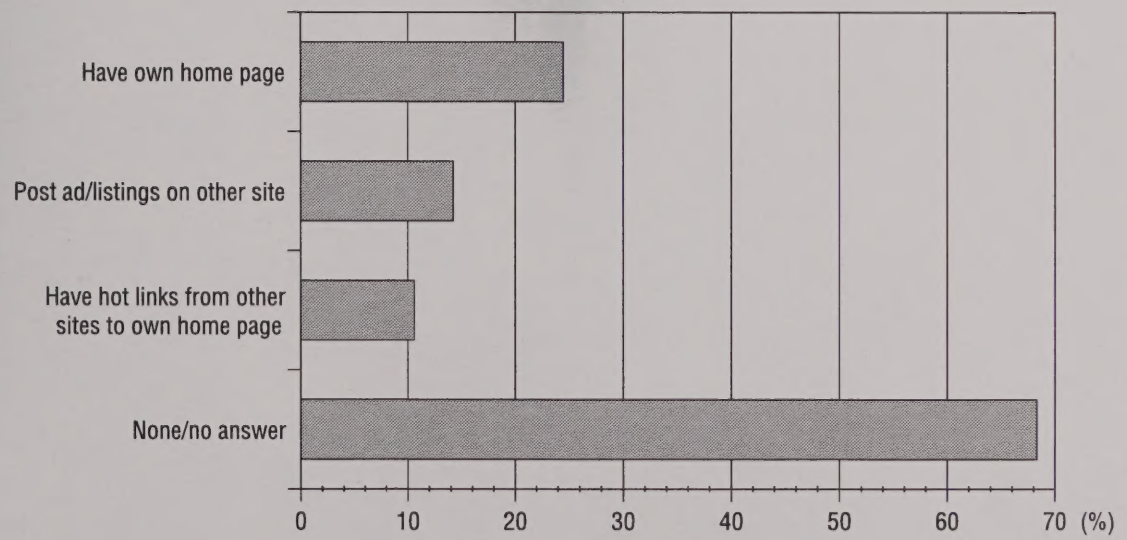
FIGURE 4
HOME PAGE PENETRATION AMONG SMALL BUSINESSES, 1997



N = 411 Internet users

Source: IDC/LINK's *U.S. Small Business Survey,* 1997

FIGURE 5
PROMOTIONAL ACTIVITY ON THE INTERNET AMONG U.S. SMALL BUSINESSES, 1997



N = 411 Internet users

Source: IDC/LINK's *U.S. Small Business Survey,* 1997

TABLE 6

USES AND PROSPECTIVE USES FOR THE INTERNET AMONG U.S. SMALL BUSINESSES, 1997 (%)

	Use Now	Will Be Using in 12 Months	Year-on-Year Growth	Non-Internet * Users' Planned Adoption
Electronic mail	75.5	79.9	6	61.5
Specialized industry/ professional information	43.9	49.2	12	51.1
General business news databases	41.6	44.4	7	46.8
Product information	38.4	42.1	10	43.5
Competitive information	26.0	28.4	9	35.1
Travel/entertainment reservation services	24.6	29.3	19	20.9
Buying products from others	23.6	29.7	26	37
Computer bulletin boards	18.7	20.0	7	25.4
Communications/data exchange with telecommuters	17.1	19.3	13	20.2
Selling products/sales leads	16.2	24.7	52	36
Remote sales order entry/inquiry	13.9	16.6	19	18.5
Credit information	13.5	17.2	27	29.6
Online banking	13.2	19.4	47	29.1
Financial databases	25.2	28.6	13	24.6
Telecommuting employees	9.7	13.2	36	11.6
N (Internet users) =	411	411		
N (planned Internet users within 12 months) =				100

* Includes Internet users not currently using application
Source: IDC/LINK's *U.S. Small Business Survey,* 1997

Internet-using small businesses are advertising on other sites, and even fewer Internet-using small businesses have linking arrangements with other sites.

IDC expects that all three promotional activities will increase in acceptance. As small businesses become more creative in their Internet marketing techniques, IDC believes strategic linking will play a stronger promotional role because it allows small businesses the opportunity for advanced, cross-selling techniques at potentially little or no cost.

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IDC's forecasts of IT opportunities

The Y2K Forecast Calls for Pain, But How Much?

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Annoying or Embarrassing Problems 7

The Impact of External Data Relationships on Y2K Issues: The Beach/Oleson Pain Index 8

July 15, 1998
IDC # 16886
Vol. 33, No. 7

As the millennium draws nearer to its close, the hype surrounding the "Year 2000" issue is reaching a crescendo. How much sleep should IS managers really lose over the dilemma? Research from IDC indicates collectively they may lose a lot, but on an individual basis they should be able to weather the storm.

At this stage in the Y2K game, most companies have addressed the issue and will suffer Y2K pain in varying degrees depending on three factors:

- Not finishing the work in time
- Failing to find bugs because of inadequate testing procedures
- The degree of connectivity with outside organizations.

Although the influence of the first two factors on a company's Y2K problem is readily apparent, the third factor is less conspicuous. However, the rapid acceptance of the Internet and related business-to-business communications tools (along with traditional dependencies on external suppliers and/or customers) makes no company an island.

Given that intercorporate data relationships can number in the hundreds for large companies — and each relationship *could* introduce a bug — mathematically, it appears virtually impossible for IS departments of the Fortune 500 to identify and eliminate all the potential sources for Y2K trouble. In efforts to measure the real impact of the Y2K dilemma and to offer IS managers a model with which to determine their exposure risk, IDC and the staff at its sister company, CIO Magazine, have developed a measurement tool to quantify the potential effects of Y2K.

This issue of *The Gray Sheet* explores the findings from the "Beach/Oleson Pain Index" (named for CIO publisher, Gary Beach, and IDC's lead Y2K analyst, Tom Oleson), which calculates the

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probability of Y2K problems for different companies. This issue looks at the different classifications of Y2K problems and some measures that companies are taking to protect themselves.

THE PROBLEM FACTORS

FINISHING THE JOB

From evidence collected in IDC's latest Y2K survey, although only 4% of companies currently admit to not hitting the critical January, 2000 date, we estimate that fully 10% of large companies (revenue of $100 million or more, with an average of $1.15 billion) will not be completely finished with their projects as of that date. For smaller companies (revenue of less than $100 million, with an average of $30 million), there will be closer to 20% of companies not Y2K-ready.

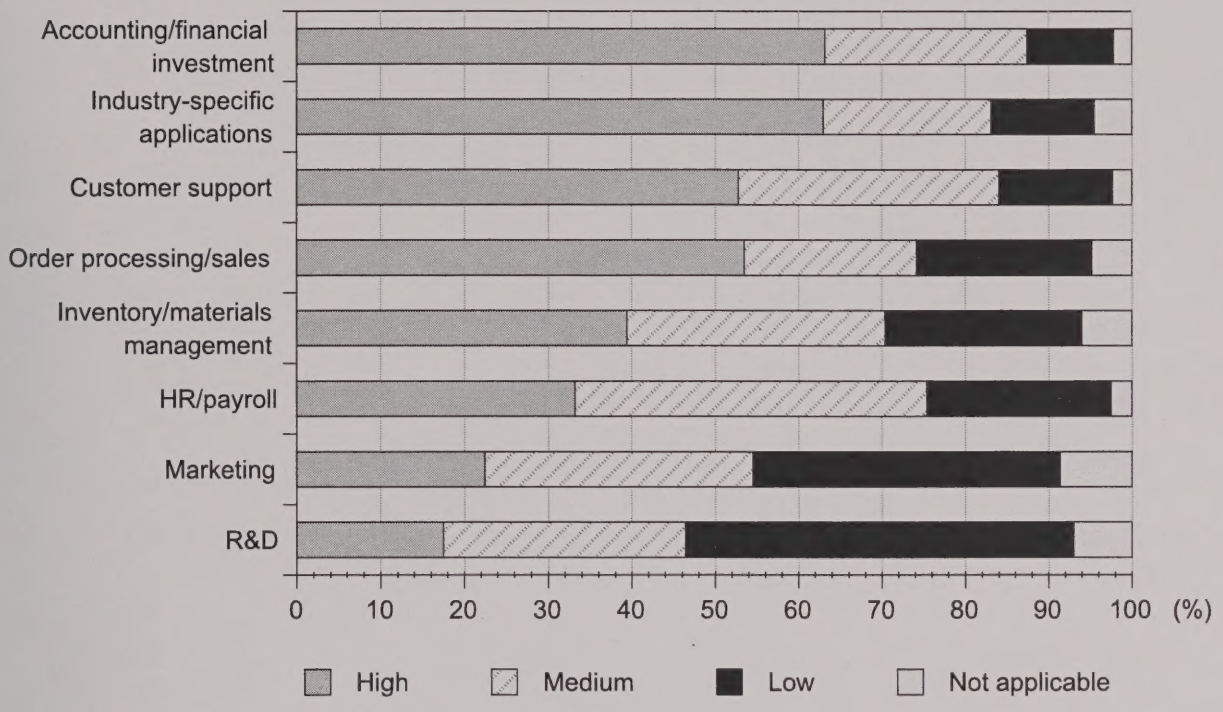
Because companies have prioritized their projects, placing greater emphasis on financial, business-specific functions, customer service, and sales, the likelihood is that most applications impacting outside organizations will be Y2K-ready at the critical time (see Figure 1). This is evidenced by the fact that the top four priorities, as shown in the figure, may have connectivity to outside organizations, whereas the bottom four are primarily internal company applications. However, there is the potential that some companies will not have all their externally connected applications ready. This is an assumption, albeit a reasonable assumption in IDC's opinion.

POOR TEST TAKING

IDC's 1998 Y2K survey uncovered a disturbing fact regarding testing. With many projects just beginning the testing phase, this testing was being approached, in many cases, in a rather haphazard manner. Depending on the application being tested, only 28.5% to 43.5% of smaller companies had a testing process or plan that they were following. Large companies were significantly better, as they were applying a testing process in 44.9% to 74.6% of the cases. However, it is IDC's firm belief that in order to minimize the number of errors that slip through the testing screen, a formal, rigorous process should be applied in almost every case.

In Table 1, IDC shows the percentage of companies that have a formal testing process applied to key functional areas. Most disturbing for small companies is that almost a third (31.8%) have no testing process at all. For the large companies, the critical factor, because of their reliance on data communications among

FIGURE 1
IMPORTANCE OF BUSINESS APPLICATION AREAS FOR Y2K COMPLIANCE



N = 400
Note: Responses weighted by company size and industry
Source: International Data Corporation, 1998

TABLE 1
COMPANIES APPLYING A FORMAL TESTING PROCESS TO CRITICAL Y2K AREAS (%)

	Revenue	
Areas to Be Tested	<$100M	$100M+
Custom applications	43.5	74.6
Packaged application software	33.7	63.2
Operating systems and tools	39.3	58.1
Multiuser hardware	28.5	52.7
Desktop hardware and software	39.6	51.1
Data received from other firms	35.6	44.9
No testing process	31.8	13.4

N = 400
Source: IDC's 1997/1998 Y2K Survey

their business partners and customers, is that only 44.9% have a testing process to catch errors coming from these outside sources. This process must change if disruptive errors coming from external sources are to be avoided. However, it is also disturbing that 13.4% of these large companies admit to having no testing process at all.

Despite the gloomy picture painted above, a second piece of good news surfaced from the analysis. The probability of having a Y2K problem is in inverse proportion to the problem's potential severity.

The reason for this is quite clear. Applications that have the most impact on companies (and therefore, have the greatest potential for disrupting the business if they were to fail) have received the greatest amount of attention. They have been placed at the top of a company's priority list for renovation or replacement, have received the greatest amount of management attention, and will also receive the most testing attention in the end. Thus, there is a greater likelihood that these critical applications will be bug-free.

In IDC's 1996 survey of top executives, we discovered that CEOs and CFOs essentially agreed on the risks associated with a Y2K failure and, thus, on the priorities. They listed their priorities in the order displayed in Table 2. The conclusion to be drawn from this table is that both groups of executives placed the impact on customers and business partners very high on their agenda. In a separate survey of 275 CIOs, IDC found that although CIOs concur with placing customers first (64.1%), they placed the financial health of the company second (61.5%). This attention from the top of the company is reflected in the priorities displayed back in Figure 1.

With Friends Like These, Who Needs Enemies?

In IDC's 1996 Y2K survey, we determined that a very large segment of leading companies rely on connectivity to external data sources. At that time, 90.6% of all large companies shared data with outside organizations, such as customers, business partners, or governmental agencies. This figure has grown in scope since then with the expansion of the Internet. (As of 1997, IDC's Global Information Technology Survey found 88% of large U.S. companies had access to the World Wide Web.)

Realizing their vulnerability to Y2K bugs emanating from

TABLE 2
TOP MANAGEMENT ASSESSMENT OF RISK AND PRIORITIES FOR Y2K (%)

	CEOs	CFOs
Customers of the company	49.0	55.0
Competitive position of the company	43.0	39.0
Business partners of the company	41.0	40.0
Financial health of the company	35.0	39.0

N = 100
Source: IDC's *1996 Y2K Survey*

sources not under their control, many large companies have begun to check on the status of their partners' Y2K preparedness. This inquiry has taken several forms.

Although some companies have ignored the threat of Y2K bugs coming from outside organizations, some companies audit other companies' preparedness first by telephone, discussing the state of Y2K projects with their partner's IS department. Other companies send letters to their business contact within the company, asking for a frank, written assessment of its preparedness. These inquiries often go far beyond discussing the business application that links the two companies and addresses the entire preparedness of the business partner, including its internal financial system's readiness. Some inquiries are more formal and ask for responses to written questions, almost to the point of intrusion into the operations of the partner. Finally, some go so far as to send a contract or contract addendum, specifying that their partner must comply by signing the contract that guarantees no harm to the company. IDC does not advocate this approach, however, these companies cannot be faulted for trying to protect themselves.

Classifying Y2K Problems

Too often, in IDC's opinion, media and scaremongers have focused on the potential of a Y2K catastrophe. No effort has been made to categorize and quantify the potential for problems and to put them into perspective. The Beach/Oleson Pain Index undertakes just that. We divide potential problems into four categories:

- Catastrophic Failures
- Business-Critical Problems
- Disruptive Y2K Problems
- Annoying or Embarrassing Problems

Catastrophic Failures

By IDC's definition, a catastrophic problem must have socioeconomic impact beyond the company or its business partners. Such catastrophic failure would encompass both scope and duration. Some might cite an extended failure of several electric grids, such as the November, 1965 power outage that impacted the east coast of the United States. This had the scope to be a potential catastrophic disaster. It extended from Canada in the north, to Washington D.C., and as far west as Ohio, but it occurred shortly after 6:00 PM and was largely corrected within 12 hours. Business the next day faced some disruption as nightly computer systems had to be run during the day, and investment houses in New York City may have had problems connecting with foreign exchanges, but the phones continued to work through the outage. So to have such a failure become a catastrophic disaster, it would have to extend over a business day. Because January 1, 2000 falls on a Saturday, the time the problem would appear, it is difficult to construct a believable scenario that would extend the outage beyond 54 hours and into Monday, January 3, 2000.

Another example of a catastrophic event might be the devastating Hurricane Andrew that struck South Florida in 1994. However, a year 2000 bug is not expected to destroy property and infrastructure. The repair of software bugs will not take many months. The average bug can be found and fixed in less than three hours. Strike that scenario. The series of tornadoes in the Midwest on the last weekend of May, 1998 prevented customers in New England from using their credit cards for a few hours on Sunday. This is the closest parallel to a potential catastrophic Y2K problem we can identify. It had the scope, but lacked the duration to severely-impact business or to have socioeconomic impact. In the supermarkets and retail stores, both merchants and customers coped, using cash or checks

instead of plastic for that period. By Monday, the crisis had passed. Of course there was disruption, and some people might have had to return home without everything they wanted, but even this, given its short duration, had no lasting effect. Those most impacted were travelers away from home who were relying solely on credit cards.

The risk of embedded chip failures will pass after the turn of the year at midnight on January 1. Potentially, systems that have been shut down for the holiday weekend will have failures as they are brought back online on Monday. But what is the probability of a catastrophic failure with socioeconomic impact from a system that could be turned off for the holiday weekend?

Because many production systems will be running after midnight on Sunday, January 2, 2000, this will be a critical time for Y2K failures. Programmers brought into the office in the wee-small hours of the morning because of a system failure in a production system will rarely find that they cannot locate the source of and fix the ABEND within a few hours. Also, because a Y2K failure would be associated with a year date field, the identification process for locating the bug will be minimal. However, such systems are more likely to have impact limited to one or a few companies, not the general public.

We cannot present an exhaustive analysis of all scenarios here, but the point is that it will be very difficult to have a catastrophic Y2K problem. Therefore, IDC places the probability of such occurrence well below one one-hundredth of one percent (0.01%).

Business-Critical Problems

Business-critical problems from Y2K bugs have a scope limited to one or a few companies. The defining characteristics are that a system failure will have a major impact on the business and that the errors may not be reversible. The first distinguishing factor for this to occur is that there is a computer system shutdown, not a computer glitch that produces erroneous results. The second distinguishing factor is that the shutdown must last long enough to cause significant impact on the financial well-being of or customer loyalty to the company. The duration of a system failure would vary from industry to industry before it became business critical.

For example, assume that a Wall Street brokerage house fails to bring up its trading system on Monday, January 3, 2000. With the possibility of a volatile market that day, particularly if there are stories in the paper about a few, well-publicized Y2K problems, being off the air for a few hours could create major losses for some clients. (Others, of course, might make a major profit that they didn't expect because their trades were delayed.) However, many of those clients might well lose faith in that brokerage house and move their business elsewhere.

A contrasting example of business-critical problems from the automotive industry shows that a significantly longer outage would have a different impact. If the supply-chain software fails and parts critical to the continued production line operation are not ordered, the company might lose sales. But this is a stretch. As recent strike actions at General Motors show, it takes several days to bring assembly lines to a standstill. Moreover, orders do not need to be produced by computer. They could be produced by word processors and either faxed or e-mailed to the supplier. Moreover, virtually every major company has considered its disaster recovery scenarios to cover all major business functions in case its data centers are destroyed, and these companies have established manual backup to cover these situations. Some might argue that for those companies expecting to migrate an application to a computer disaster recovery center, the manual argument does not apply.

However, for those who have constructed such plans, they understand that there will be about a 48-hour period following a disaster when no computer will process critical applications. Therefore, for truly business-critical applications, there must be an interim manual solution, even if it is to be migrated soon to another computer. This means that the number of business-critical applications in which business or money is actually lost irretrievably is highly limited.

Therefore, IDC concludes that the likelihood of business-critical application failures is also very small, somewhere in the range of two-tenths of one percent (0.2%).

Disruptive Y2K Problems

Disruptive Y2K problems will be more common. Disruptions will result not necessarily from a system failure, but from a system producing inaccurate data that corrupts repositories in a company and possibly those of its business partners connected to the application via the Internet or leased line. The distinguishing characteristics of these are first, that the application error does not threaten the well-being of the company and, second, that the errors — when found — are correctable. In some cases, the system may stop functioning for awhile, but the duration of the outage is not critical to the businesses' well-being. Any date math errors or branching logic errors will fall into this category, as will most of the sorting errors.

These will be the most common errors that need immediate attention to correct the errors and clean the data. IDC estimates that such errors will occur in about three-fourths of one percent (0.75%) of applications.

Annoying or Embarrassing Problems

Annoying problems will be the most common and may persist for several months into the 21st century because they have minimal impact on the business and are lower priority. The distinguishing characteristics of these problems are that the errors can be understood by humans and human adjustment permits continued use of the systems even with the uncorrected errors.

Examples of this could include having passwords expire as being too old. Once this is corrected by a log-on procedure, the problem will disappear, but IS will have egg on its face for missing a problem everyone in the company sees. Other examples of annoying problems are printed documents with two-digit year displays of 00 instead of 2000, or printed documents sorted by year dates that are two characters long. Human flexibility being what it is, the recipient of a printed listing with the year 00 on page one and the year 99 on the last page will have little trouble adjusting to the order temporarily, but the IS department will certainly get a ribbing. Even more embarrassing will be customer feedback that they had received an incorrectly dated document.

IDC believes these minor errors will be the most common, perhaps double the frequency of disruptive errors. We estimate 1.5% of applications may have such problems.

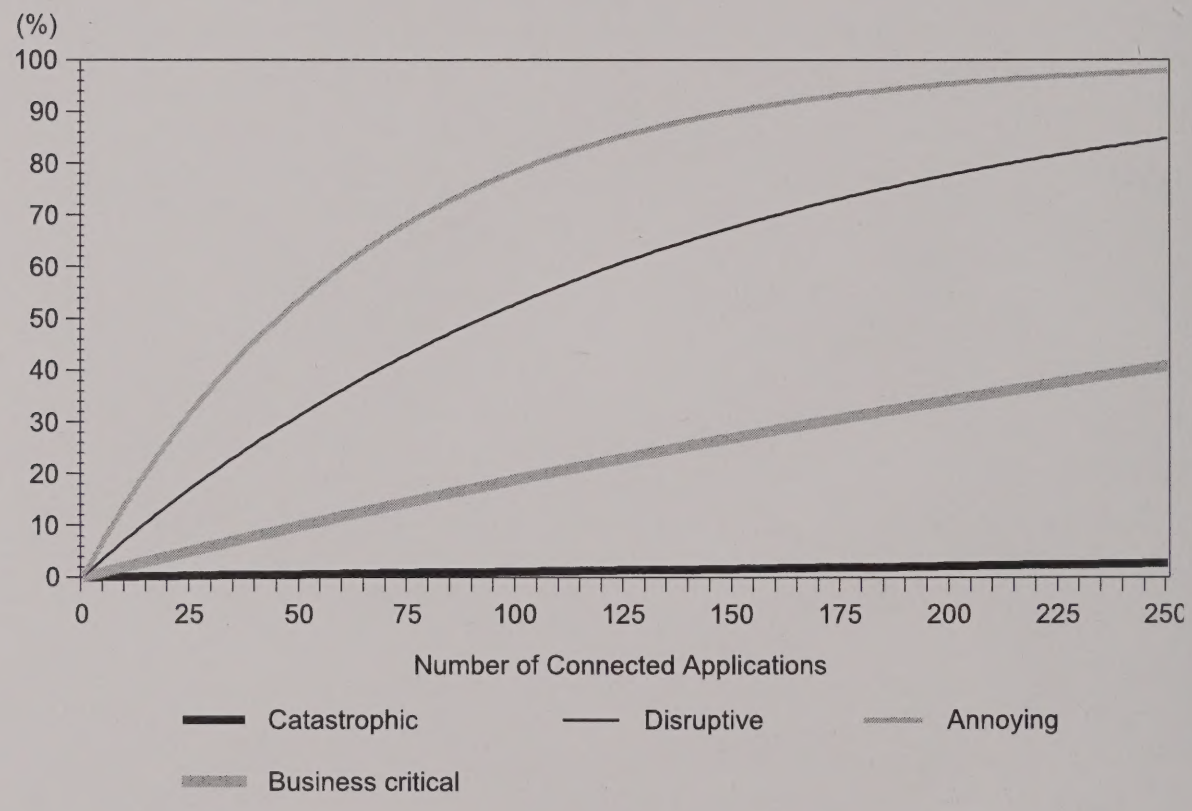
The Impact of External Data Relationships on Y2K Issues: The Beach/Oleson Pain Index

The probability of a company experiencing a year 2000 problem is not the same as the 2.5% probability that an application will have a bug. The probability of experiencing a Y2K bug for any company is associated with the number of internal and external applications used by the company. The formula for determining the probability of experiencing a Y2K bug is as follows: $P=1-(1-a)^N$, where "P" is the probability of experiencing a Y2K bug; "a" is the probability of

finding one of the four types of errors in an application, and "N" is the number of applications to which your company connects.

The probability for each type of error previously described is separate, and they are not additive. By plotting each on a chart (as shown in Figure 2), with the X-axis displaying the probability of experiencing a bug and the Y-axis showing the number of applications to which a company is connected, one quickly sees that the likelihood of problems mount dramatically as the number of connections increases. As the number of applications increases, the Y2K pain also increases.

FIGURE 2
Y2K PAIN INDEX PROBABILITY CURVES



Source: International Data Corporation, 1998

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Practical Portals: Beyond the Web's Front Door

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Summer has heated up in the Internet content market, with portal sites exploding on Wall Street on the heels of investments and partnerships by some "old world" heavy hitters. But even with venerable names like NBC and Disney backing the wonder kids of the new economy, industry insiders are questioning what role these sites will play in an established information society and how long the summer lovin' between the financial community and the hardly profitable portal players can last.

Investors may look to the portal plays with measured incertitude, but technologists must view them with curiosity. Aside from free e-mail and some personalization features, not much differentiates the portal sites from hundreds of other sites on the World Wide Web. A technologist might ask, "Why are these sites so popular, and what can other sites do to achieve similar fame?"

That question prompts a thorough examination of the dynamics of the Internet as a communications medium. Yahoo! and brethren tout themselves as the front doors to the Internet – the place where users go when they aren't sure where to go next. But what happens when users do know where they want to go next? And what compels users to go anywhere?

Users take to the World Wide Web to solve specific needs. These needs include communicating (through e-mail and chat), finding information (by browsing home pages and usenet groups), and seeking entertainment (through games or entertainment sites). These needs vary from user to user, but every time the Internet serves up sites that meet these needs, it affirms its potential as a media platform.

To operate as a viable business, each Web site must cater to users by meeting certain needs. At present, a site's viability is measured by the number of users it serves, and popular sites are striving to offer content that meets the needs of as many users as possible – thus ensuring healthy ad sales and reliable income. These sites are positioning themselves as mass-media outlets of the cyber frontier.

However, many industry insiders profess that the World Wide Web's value proposition

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is not as the next great mass medium (like TV is). Instead, the World Wide Web provides value through its numerous discrete, segmented sites and communities. As the number of Web surfers grows, so grows the demand for different, unique content.

In short, as the Web grows, traditional Web business models may change.

Although search sites provide utility through their search capabilities and free e-mail service, can't a Web site offer more – or at least something different? And can't a Web site offer entrepreneurs and investors more than advertising as its revenue stream? Even in an age where users are reluctant to pay for content, some sites are offering more, and through sheer utility these sites may rise to challenge the popular portals for a slice of their eyeball share.

IDC calls these sites practical portals, and this issue of The Gray Sheet profiles three existing sites that offer real added value – value that only the Internet platform can supply. The sites profiled here are:

- NECX – The veteran broker of computing supplies and components has developed a virtual trading room where computing manufacturers and the general public can get commodity prices on PC components and finished products.
- FairMarket – A distant cousin of NECX, FairMarket offers computing products at auction, embodying the full spirit of supply and demand.
- iCat – This e-commerce software mainstay has created a community for small and midsize e-businesses, where online proprietors can host their sites and find valuable business resources for marketing their ventures.

The practical portals profiled in this Gray Sheet share some features. By far, they are lesser known than media darling Yahoo!, but each presents a compelling business model that strays from traditional advertising. Practical portals, much like their superstar cousins, attempt to build community, but the sense of community at the practical portals comes from discrete utility.

Practical portals' business models are very Web-centric; they would not enjoy the same success in an environment where their audiences and customers were limited by time or geography. For example, commodities brokers existed before NECX went online, but now NECX can broker goods with customers in Asia and Europe without concern for time and space.

Practical portals have another common characteristic: the power to change established markets. Anyone – consumer or business buyer – who makes price the top criterion in a sales decision has a strong incentive

to take business to the Internet. Although buying direct has helped companies like Dell increase their margins and force price points down within their respective industries, the Internet brings the concept of supply and demand to a new level. If buyers have the ability to find the absolute cheapest cost for a specific product by using online brokers or auction sites, and this exercise costs them nothing in the way of opportunity costs or time investment, what will happen to traditional sales channels?

This issue of The Gray Sheet examines the business models of three companies that might corner the market in their industries if they build on the advantages provided by the Internet platform; it also briefly presents the successes and the potential liabilities of the portal sites that are occupying the media spotlight.

Big Name Portals: The Doorstep to the World?

What makes a portal, and how did these sites rise to the forefront of the attention of the business press and the IT industry? Any site that stakes its claim as a launch site for a user's session in cyberspace is a portal, and the ones that have risen to fame are the ones that investors have staked to be the winners in the battle for Internet revenues (which comes from advertising money, for the most part).

Table 1
Most-Visited Web Sites, June 1998

Rank	Site	Persons 12 years or older (000)
1.	yahoo.com	29,516
2.	aol.com	23,088
3.	netscape.com	18,470
4.	microsoft.com	17,784
5.	excite.com	15,904
6.	geocities.com	14,820
7.	infoseek.com	11,528
8.	lycos.com	10,081
9.	msn.com	9,615
10.	altavista.digital.com	9,116
11.	tripod.com	8,048
12.	hotmail.com	6,533
13.	angelfire.com	6,202
14.	zdnet.com	5,859
15.	amazon.com	5,664
16.	real.com	5,551
17.	mapquest.com	5,490
18.	switchboard.com	4,982
19.	pathfinder.com	4,500
20.	webcrawler.com	4,430
21.	msnbc.com	4,276
22.	xoom.com	4,218
23.	looksmart.com	4,205
24.	four11.com	4,154
25.	sportszone.com	4,051

Note: Based on unique users who visited at least once during the month.
Source: RelevantKnowledge, July 1998

Portal sites garner a significant number of hits. Internet surveyor RelevantKnowledge ranked Yahoo!, AOL, and Netscape as having the highest number of unique viewers of all Internet sites in June 1998 (see Table 1). This large volume of viewers bodes well for these sites in their efforts to establish community (and subsequently gain incremental revenue through premium content and commerce royalties), but an important question looms: will Web surfers continue to return to these sites as their need for Web searches and prepackaged news diminishes?

Because each person has unique priorities in information, traditional portal sites may end up losing the Internet battle by trying to be all things to all people. It is conceivable for the millions of Web surfers who channel through the gateway sites to start bypassing these sites and going directly to their more specific points of interest.

Why should a personal investor begin each session with a trip to Yahoo! when he can jump directly to his online broker for instant quotes and investment research information, as well as news and in some cases limited e-mail? Although many of the portal sites offer stock quotes and personalized news, they can not offer trading nor a comparable degree of investment research. In the same vein, why should a music lover who listens to Internet radio broadcasts on a daily basis start her session at Excite if she can point her browser directly to **Broadcast.com** and receive music, local news, and weather in a familiar format for practically any locality in the United States?

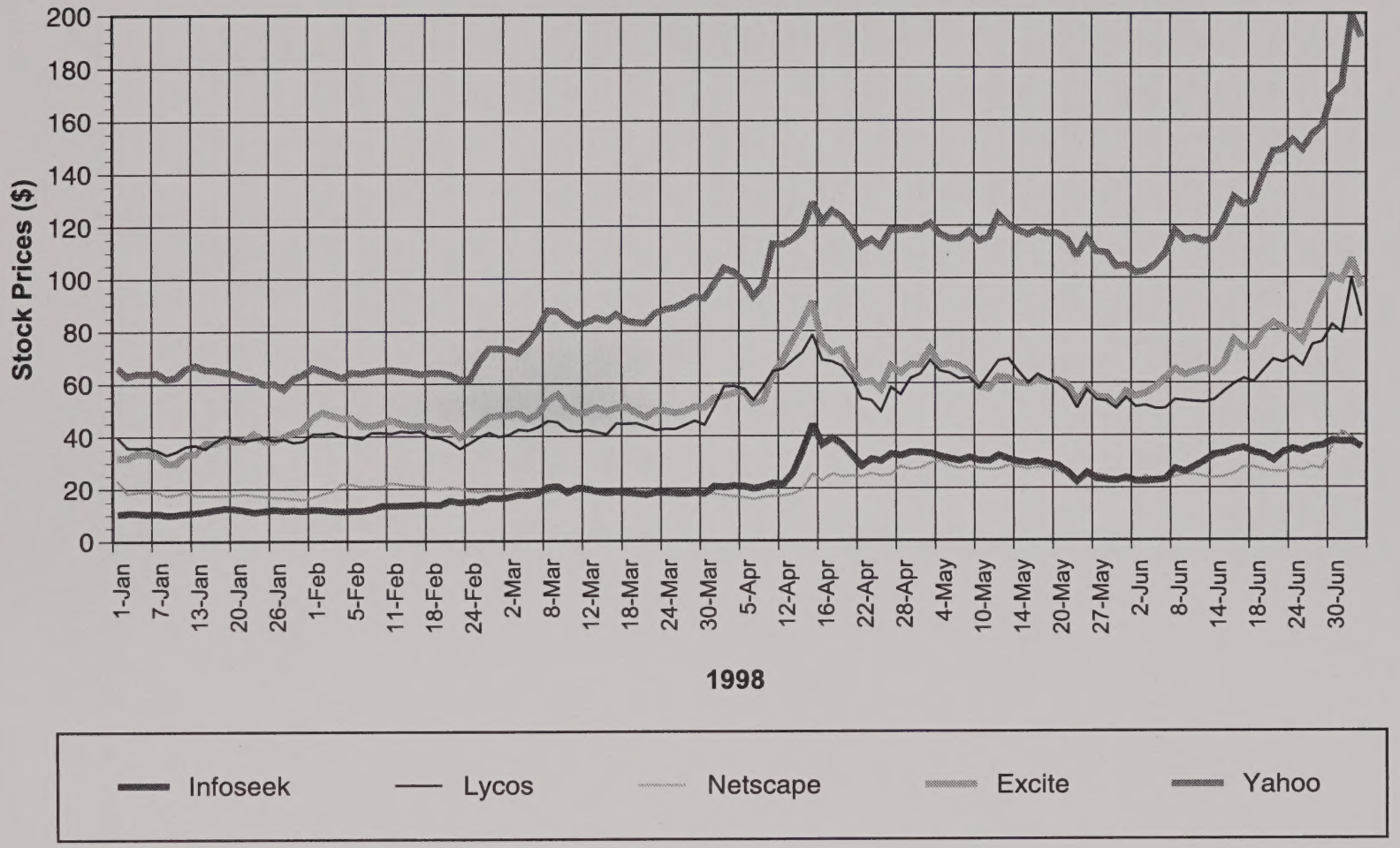
Because each person has unique priorities in information, traditional portal sites may end up losing the Internet battle by trying to be all things to all people.

TABLE 2
PORTAL SITE STOCK PRICES, 1H98 ($)

	Yahoo	Excite	Netscape	Lycos	Infoseek
December 31, 1997	66	32	23	0	10
March 31, 1998	55	18	51	21	
June 30, 1998	170	100	36	82	38
July 6, 1998	191	96	36	85	35
Total Growth December 31, 1997 to July 6, 1998	188%	201%	54%	113%	239%

Source: International Data Corporation, 1998

FIGURE 1
THE YEAR OF THE PORTAL:
VALUATION GROWTH SINCE THE START OF 1998



Source: International Data Corporation, 1998

IDC research indicates finance and music are two extremely popular interests among Web surfers, but the potential for more specialized portals is limited only by the number of special interests in the general population. This diversification of interests may not mean the end of portals as we know them, but it should raise questions about their worth.

The leading portal sites' valuations should spark fear for any shrewd financial analyst. At the beginning of July, Yahoo!'s market capitalization was $8 billion, meaning the company was trading at nearly 100 times its revenues for the preceding 12 months. In the second quarter of 1998, the company's profits were $8 million, 1,000 times smaller than its market cap. The rest of the search engines aren't quite as lofty in valuation but still exceed traditional investment logic: in the first week of July, Infoseek, Lycos, and Excite all were trading at about 30 times revenues. Figure 1 and Table 2 show the growth in portal stock prices since the beginning of 1998.

Looking past the high valuations of the portal companies, prospective Internet content players must ponder how to set themselves apart from the big brands and how to escape a reliance on the advertising revenue model. The following sections profile three companies that have accomplished differentiation and escaped reliance on advertising.

NECX

NECX is the only company profiled in this issue of The Gray Sheet that was born before the age of the Internet. Eighteen years ago, with live brokers and a telephone switchboard, NECX began facilitating sales between IT components suppliers and OEMs, systems integrators, and franchised distributors.

The Internet and electronic trading has afforded NECX drastic improvements to its business, and the company has extended its reach to corporate and computer buyers through its Home and Office Computer Center program on its Web site, www.necx.com.

Understanding the magnitude of the Internet's impact on NECX and understanding how NECX can leverage its business model into a destination site on the World Wide Web requires understanding the intricacies of the brokerage business. As a traditional broker, NECX made money two ways: it arranged sales between suppliers and buyers and charged each party a minor percentage of the sale price in exchange for the arrangement, or it bought products through its own account and sold them above the purchase price at a later date. (Reselling products, or "speculating," accounts for only a trivial portion of the company's revenue now.)

NECX still makes three-fourths of its revenue from brokering sales, and aggressive technology adoption historically has increased efficiencies in NECX's brokering business. The company's Internet use is continuing the trend.

NECX maintains EDI links with its major suppliers and distributors and has developed patented algorithms to read their inventory databases. NECX facilitates sales based on the lowest available prices listed in the suppliers' databases. At present, a prospective buyer calls a NECX sales rep, who consults the database and passes the buyer to the appropriate supplier representative. The supplier representative arranges the sale.

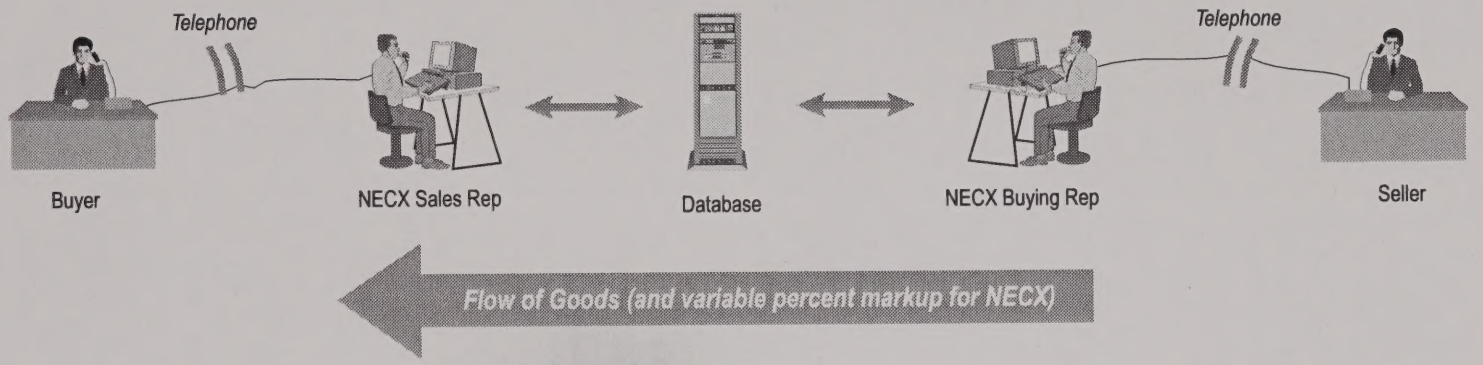
What NECX intends to do is automate the brokering process through what it calls a "black box" system. This electronic system will allow anonymous buyers and sellers to connect via the Internet and conduct sales much as true commodities traders do today. The automated system will mean truly anonymous trading because NECX works with several worldwide shipping companies to fulfill orders. The seller never performs shipping or comes into contact with the buyer.

What NECX intends to do is automate the brokering process through what it calls a "black box" system.

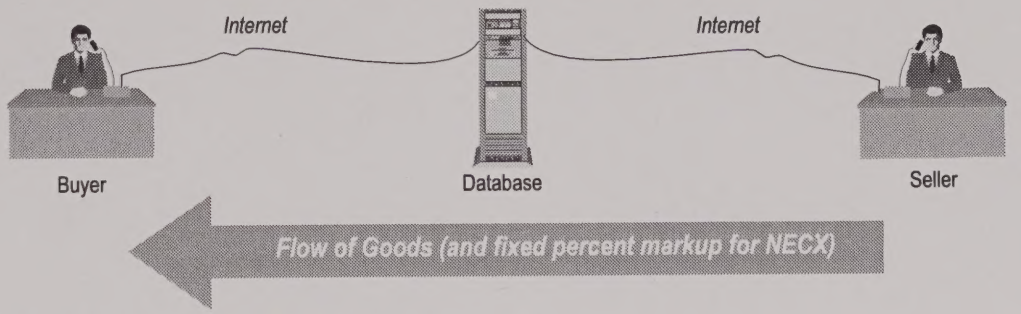
Automating this facilitation process will alter the channel for IT products significantly. This bid-and-ask system will

FIGURE 2
NECX DISTRIBUTION MODEL: PRESENT AND FUTURE

Present Model



Future Model*



* The future model will be in addition to NECX's present model

Source: International Data Corporation, 1998

have the capability of gathering profiles of buyers, to alert them when products in which they are interested become available. The model will also allow buyers to bid for capacity and make large-scale purchases that would consume a production cycle at a major component or computer parts manufacturer. This "futures contract" function would align NECX more closely with the role of Chicago Board of Trade, which helps diffuse volatility in commodity prices.

Perhaps more importantly, the new system will feature fixed-fee pricing. NECX will no longer take a percentage of the sale. If NECX succeeds in making the jump to a "black box," transaction fee-based business model, it will create significant barriers to entry for startup electronic components distributors while raising the bar for its current competitors.

This offering would lock in NECX as a must-visit site on the World Wide Web for anyone in the business of purchasing IT products, because it will offer a real-time account of the going rates for IT components and finished goods. What's more, NECX is already taking additional steps to use the Internet to expand on its existing business model.

The company has licensed its database of products to various retailers on the World Wide Web. With a hot-link button, shoppers on a site can link directly from the site they were surfing to the NECX product database and make a purchase. The partner Web-site keeps a portion of the profits from the sale; NECX keeps the rest. Partners include Yahoo! and IDG's WebShopper.

NECX users also have access to a database full of industry news articles for free, and NECX is building an auction site to sell excess inventory at potentially deep discounts. (The auction model, used at this site and FairMarket, may have some unique effects on traditional markets, which will be discussed in the next section.)

In February of 1998, NECX added prices from other major online computer retailers to prove its competitiveness and bolster its position as a buyer's agent. The company is also investigating advertising opportunities.

The degree of utility NECX provides makes it a compelling site to visit for professional IT buyers and consumers.

FAIRMARKET

FairMarket (**www.fairmarket.com**) plays a similar role in the ecosystem as its quasi-competitor NECX because it makes its revenue by facilitating sales of IT equipment from vendors and distributors to consumers and businesses. Its model differs from NECX because sellers list their goods on FairMarket at auction, not at retail or wholesale. At FairMarket, neither buyers nor sellers are anonymous. Although NECX is pursuing an auction strategy to help its sell-side clients unload back inventory, it still makes most of its money by brokering traditional sales. FairMarket, however, is auction-only. The company charges a 2% fee for sellers when they complete a transaction and it charges $2 for each stockkeeping unit (sku) listed.

The company's business model is as straightforward as a true auction. Users (business or consumer) can register for free and enter bids on goods posted for sale at the FairMarket Web site. The seller sets the auction time and duration of the sale, as well as the quantity of units available and the minimum number of units a buyer must purchase. Sellers can also set unpublished reserve prices, meaning the goods will not be sold for less than an amount that is not specified during the auction.

Because FairMarket started as a business-to-business service, sellers usually sell large quantities of a single product and sometimes require bulk purchases. However, all members of the channel participate at FairMarket – from vendors to retailers – so consumer shoppers have no shortage of single-lot goods to choose from.

One difference between the real-world auction and the cyber auction is the occurrence of ties. At the close of the auction, the FairMarket system awards the purchase to the highest bidders, of course, but for each tie bid, the sale is awarded to the bidder purchasing the most units.

If the tie still exists, the sale goes to the bidder who placed the order first.

FairMarket has made several changes to its business model of late – changes IDC believes will be essential for other auction sites to emulate. FairMarket used to accept all goods from vendors prior to auction and store them until it was time to ship to the buyer. FairMarket also used to process all payments and later forward the proceeds from each sale to the respective vendor. Now, FairMarket performs no shipping or payment functions. The site merely facilitates the sale and at the close of each auction forwards buyer information to the seller. The seller processes payment and performs shipping.

FairMarket has made several changes to its business model of late – changes IDC believes will be essential for other auction sites to emulate.

By divesting itself of all shipping and payment processing responsibility, FairMarket can afford to charge very low commissions and provides sellers a strong incentive to use the site as a distribution channel.

The new distribution channel that sites like FairMarket provide is a powerful one. It puts tremendous pressure on the channel to move goods quickly, and it pressures vendors and manufacturers to develop new products. For example, at press time for this newsletter a consumer could visit FairMarket and post the leading bid for a Compaq laptop PC (150MMX, 16MB RAM, 20X CD, and modem) for $1,150. A consumer could visit NECX and buy a slightly faster Compaq model (166MMX) – but without CD and modem – for $2,000. The cost-benefit analysis on these two products should make this purchase decision a no-brainer.

In the business-to-business space, the auction channel may not be the most viable way to buy IT products because product availability is not guaranteed. In the Compaq example above, for instance, only one machine was available. Businesses also will have trouble finding leading-edge products at auction, where offerings are often dated. But in the case of the Compaq portable PC, the older model proved quite competitive with the new model available at NECX and at a significant price advantage.

If desperate channel partners or vendors begin making product available in volume through the auction channel consistently, corporate IT buyers may be compelled to investigate the auction on a regular basis.

The Internet adds tremendous leverage to the auction model. When the auction was a characteristic of small country towns, disparate locations and finite selling periods made it an inefficient way to buy and sell. On the Internet, which is immune to such problems, buying on auction is no different than buying at a Web retailer.

FairMarket is already taking steps to build its position as a destination site on the Web. In addition to its auction model, it is pursuing advertising relationships with major IT vendors. FairMarket could improve its offering as a destination site if it could find a way to integrate more content with its product offerings (e.g., product reviews) and improve the look and feel of the site. For the time being, however, the value proposition offered by the auction model should prove enticing enough to draw a crowd.

iCat

iCat, the renowned electronic commerce software provider, is throwing its hat in the ring as a practical portal site on the World Wide Web. Prospective electronic merchants can create their sites with iCat's store-building software and then host them through iCat instead of buying their own server hardware and maintaining their own 24 x 7 Internet connection.

Although hosting commerce sites isn't new – Internet Service Providers have been offering that service for a while – iCat is trying to add value to the equation by creating forums and links for merchants to use to promote their sites and develop e-commerce strategies. iCat believes if it can create a site that offers one-stop shopping for e-merchants to establish their business, it will reap the benefits

in hosting fees and perhaps eventual software sales as businesses outgrow the services provided through site hosting.

After building their store at **www.icat.com,** merchants can visit iCat's Marketing Services and Commerce Source areas to gather helpful information for running an online business. iCat has linking partnerships with a number of Internet service and supply companies so iCat users can perform business functions (e.g., order graphics or place banner ads) without leaving the iCat site (see Table 3).

iCat also gives its users a chance to build their own sense of community through a linking relationship it has with **www.dejanews.com.** Deja News is another example of a practical portal (to be profiled in future issues of this newsletter). It has an enormous community established around direct links

TABLE 3
KEY PARTNERING AGREEMENTS
BETWEEN iCAT AND OTHER INTERNET COMPANIES

Company	Service or Utility Provided
NameSecure	Registers unique domain namesfor businesses
Submit It!	Registers sites with search engines and directories
Junglee	Registers sites with shopping guides
ipublishLive	Provides graphics for store fronts and catalogs
Mac Zone/PC Zone	Hardware/software partners
DoubleClick	Banner ad placement
CyberGold	Interactive advertising and promotion
MailCity	Sets up free e-mail
Bizrate	Monitors customer security and satsifaction
Coolshopping	Monitors customer security and satsifaction
WebWatchdog	Monitors customer security and satsifaction
Deja News	Provides linking to Internet communities
RelevantKnowledge	Monitors Web traffic

Source: iCat, 1998

For Free, or Not For Free?

That is the Question

As worldwide Internet advertising revenues become more diluted through the sheer growth in Web sites, content providers will be forced to rethink the question of charging fees for their offerings. But the question to charge is several fold. Will viewers visit a site where nothing is available for free? Can a mix of premium content and free, advertising-supported content generate profits? If sites do charge for content, should they charge on the subscription model or on the pay-per-view model?

Although most hard-core 'Netizens immediately associate these dilemmas with well-known Web publishers like CNET, CNN, *thestreet.com,* and the Wall Street Journal's online edition **(www.wsj.com)**, the question of charging for content has been pondered for years by pure-play information publishers like Lexis-Nexis.

Lexis-Nexis, Thomson Financial Services, Dow Jones, and others are members of an industry that generates in the neighborhood of $30-40 billion per year from selling proprietary and aggregated information to a clientele of institutions and professionals. It is an industry that was supposed to die with the advent of the World Wide Web and the onslaught of free content.

The information publishing industry did not die, however. Although it underwent a shakeout and a period of mergers and acquisitions, information publishers are surviving. They've just had to make a few adjustments – adjustments pure Web publishers will have to adopt in one form or fashion if they wish to escape the pure advertising revenue model.

Information publishers are combining their databases of information with knowledge management tools to offer higher forms of business intelligence. Information publishers are also capitalizing on years of branding.

Internet publishers should learn from their old-school cousins. The Wall Street Journal has capitalized on a century's worth of strong brand by boldly charging for all of its content. CNET and CNN might be hard pressed to try such a strategy – as page views would likely diminish and advertisers would flee in droves. However, with personalization software and some simple knowledge management tools, Internet publishers might create a service valuable enough for the general public to pay for.

The approach of a widely accepted micropayments platform may signal an even greater opportunity for Internet publishers to decrease reliance on advertising. IDC believes subscription revenue models are somewhat counterintuitive to the nature of the Internet because users have not widely adopted the Internet as a push medium (like television). Even though subscription services don't have to push content, once users have paid their yearly subscription fee, the balance of power in the information exchange has shifted to the publisher. Micropayments give end users complete freedom to choose the information that is most valuable to them.

The important thing for Internet publishers and information publishers have to grapple with is this: Information and technology are no longer separable entities. Technology adds the value in value-added information, and publishers that capitalize on technology will capitalize on the opportunities their respective markets provide.

to the Internet's vast newsgroup content. iCat suggests its users link their commerce sites to Deja News' "LinkBack" system, which lets merchants link directly to news groups that discuss their products.

iCat's hosting offering can be both a blessing and a curse. IDC believes small businesses will opt for a third party to host their commerce sites because of the prohibitive equipment and consulting costs associated with building sites in-house. The iCat hosting service has received a fair amount of trade press coverage. However, iCat also does significant business with ISPs who offer their own hosting solutions, and iCat sells a considerable amount of software into and through this channel. Several ISPs have already complained about this new competition in the hosting space, and industry sources claim several have terminated their agreements with iCat on the software side.

iCat believes if it can create a site that offers one-stop shopping for e-merchants to establish their business, it will reap the benefits in hosting fees and perhaps eventual software sales as businesses outgrow the services provided through site hosting.

IDC believes the threat ISPs may feel from iCat's venture into hosting and community building bolsters the theory that sites that offer a primary utility can siphon off a fair portion of Internet traffic. As the relatively extensive list in Table 3 shows, iCat (and other sites in the practical portal vein) can mix a little bit of "brand name" with a fair degree of functionality to create a compelling business proposition for users.

iCat and the rest of the practical portals may not carry Yahoo!'s level of stardom, but they may be carrying heavier bags to the bank in the not-so-distant future.

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THE GRAY SHEET

IDC

IDC's forecasts of IT opportunities

U.S. Students and Children: The Real "Next-Generation Internet Market"

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June 1, 1998
IDC #16478
Vol. 33, No. 4

A few months ago, a joke circulated through the IT community: How do high school teachers install computers in their classrooms? They call kids from the grade schools to do it.

It's drollery with a drop of truth to it. Research data indicates that students are more likely to own and use a computer than the general population and also that children are strong motivating factors for heads of households to purchase IT products. Common perception says children approach technology without reluctance, unlike many of their elders.

Industry insiders can gain two valuable pieces of insight from the study of IT adoption in the youth-related segments of the market.

- First insight: The student markets are large enough to warrant the attention of IT vendors. The K–12 education market segment spent $6 billion on technology in the 1997–1998 school year, and students in higher education (two and four-year colleges) spent about $12 billion in calendar year 1997. Higher education institutions spent nearly $9 billion (for student computing facilities and overall system infrastructure). Combined, those figures add up to $27 billion in IT spending by or for students.
- Second insight: The predilections of the student population and homeowners that buy IT products for children foreshadow potentially important trends for the mass market. For example, the market segment that IDC calls "progressive parents" shows a stronger-than-average willingness to pay for online content, and a healthy 97% of K–12 schools have some form of Internet access — nearly double the penetration of U.S. business sites.

Forward-thinking vendors can use the above insights in two ways: They can target the needs of the growing educational market, and they can plan for fundamental shifts in user demand and expectations as today's children become the mass market in the near future.

This issue of *The Gray Sheet* presents findings from several IDC/LINK studies: the *Education Market Technology Review and Forecast, 1997–2002,* the *1997 U.S.*

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Home Media Consumer Survey, and the *1997 U.S. Higher Education Market Study.*

EARLIEST ADOPTERS: K–12 STUDENT USERS

Granting children access to information technology at an early age is a priority for many in the United States, from concerned parents to President Clinton and his administration — which is determined to bring the Internet to every classroom by 2000. At as young as five-years old, end users in the K–12 market give new meaning to the term "early adopter."

IDC/LINK expects that technology expenditures in the educational segment will surpass the $7 billion mark during the 1998/99 school year. Table 1 shows that computer hardware dominates educational technology spending within the United States. However, networks and online services will be the two fastest-growing segments within the next five years. The addition of e-rate funds (see box), along with existing government and vendor funding and discounts, presents a great opportunity for hardware vendors, ISPs, and telecommunications companies to further penetrate the K–12 market.

The traditional education leaders, including Apple, IBM, Compaq, Dell, and AOL, have already established a loyal following within the market. The increase in available funds from the e-rate program, however, will allow for further penetration into the market for some of the old timers and an opportunity for newcomers such as Sun, Acer, and NEC as well.

Networking hardware, such as servers, hubs, routers, and switches and online/telecommunications services will dominate the spotlight while the e-rate funds are being distributed. However, it is important to remember that the networks that schools are focusing on cannot be optimally utilized in classrooms without the appropriate tools, such as PCs, educational software, and various peripherals. Spending from e-rate funds will eventually trickle down to those vendors not directly affected by the e-rate discounts, such as PC, software, and peripherals vendors.

Tables 2 and 3 show the vendors that enjoyed visibility in the K–12 market by selling hardware in 1997.

The portent for what can be described as a sort of generational leapfrog appears in Internet adoption statistics. A commendable 97% of schools in the United States have at least limited Internet access; this access may be through computers in the classroom or, more likely, in the library or a computer lab. More than two-thirds of U.S. schools used an online service in 1997. At the classroom level, Internet penetration drops significantly to 33% — indicating more work for Vice President Gore and more controversy surrounding the embattled e-rate (see Figure 1).

The percentage of schools with Internet access dwarfs the percentage of all U.S. businesses with Internet access. According to business data provided by County Business Patterns and survey data from IDC's Global IT Survey, only about 49% of all

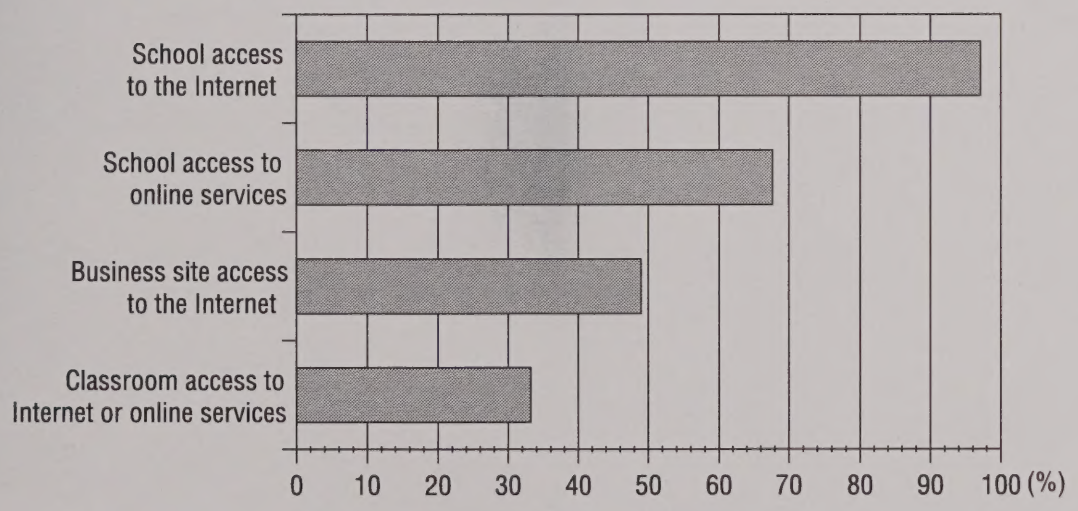
TABLE 1
U.S. EDUCATIONAL TECHNOLOGY EXPENDITURE, 1996–1997 TO 2001–2002 ($B)

	1996–1997	1997–1998	1998–1999	1999–2000	2000–2001	2001–2002	1996–2001 CAGR (%)
Hardware	2.14	2.99	3.47	4.00	4.47	4.65	17
Software	0.53	0.55	0.59	0.63	0.65	0.71	6
Supplies	0.22	0.26	0.26	0.26	0.27	0.27	4
Training	0.24	0.33	0.43	0.54	0.65	0.68	23
Service and support	0.24	0.30	0.34	0.39	0.44	0.50	16
Online service	0.09	0.22	0.44	0.56	0.64	0.73	51
Networks	0.66	1.27	1.47	1.71	1.98	2.29	28
Other	0.03	0.04	0.04	0.04	0.05	0.05	10
Total	4.16	5.95	7.04	8.13	9.13	9.88	19

Note: Definitions are available in *IDC/LINK's Education (K–12) Market Technology Review and Forecast, 1997–2002*

Source: IDC/LINK, 1998

FIGURE 1
PENETRATION RATES OF INTERNET AND ONLINE SERVICES IN U.S. SCHOOLS AND CLASSROOMS, 1997



Source: IDC/LINK's *1997 K–12 Technology Survey*

businesses have access to the Internet, and these numbers exclude home businesses, which IDC believes have about the same penetration rate.

If business Internet penetration doesn't increase soon, it seems plausible that some students will enter the workforce with more Internet experience than many of the people working at their future place of employment.

IRATE OVER THE E-RATE

POLITICAL IMPLICATIONS SPREAD FAR BEYOND EDUCATION

The K–12 market has become the focal point for media and political attention in recent weeks because of the FCC's decision to limit funds for the e-rate, a controversial plan to subsidize information technology purchases by rural and poor schools and libraries.

The e-rate was established under the Telecommunications Act of 1996 and has been championed by Vice President Gore as part of the Clinton administration's policy on technology and education. Officially called the Universal Service Program for Schools and Libraries, the program provides eligible schools and libraries subsidies of 20% to 90% on telecommunications service, Internet access, and internal networking. The level of discount is determined by need.

Funding for the 1998 e-rate program was slated to be $2.25 billion. However, after a great deal of pressure from congress, the FCC (charged with administrating the program through an organization it created called the Schools and Libraries Corporation) cut funding by 43% to $1.275 billion. Why would congressmen aim to quash a motion with such blatantly good intentions? The devil is in the details.

Some senators have argued that the FCC overstepped its bounds when it created the Schools and Libraries Corporation to administer the e-rate program, and an investigation by the General Accounting Office indicates that congress should retain more say in how e-rate moneys are collected.

More pressure is coming from the long-distance carriers, which, in essence, are funding the e-rate. According to the program, e-rate funds would come from the universal funds that long-distance companies pay into so that rural and poor areas can receive phone service. The FCC hoped the long-distance carriers would see lower access charges from local phone companies and regional Bells after the deregulation brought about by the Telecommunications Act of 1996 — thus preventing an increase in long-distance charges to cover the e-rate.

AT&T shattered the FCC's hope when it announced a 5% rate hike for all interstate and international calls. MCI followed suit, and the companies blamed the e-rate for the new charge. The FCC and e-rate supporters in congress say this is a way to mask new charges and fleece the consumer. The FCC further contends that local access charges have been cut by deregulation and implies that long-distance companies may be using this leverage point to instigate further government pressure on the Baby Bells to lower access charges.

What's the big picture? The dollar amounts allocated for the e-rate pale in comparison with the amounts collected in local access fees, so the e-rate becomes the bait for long-distance-company hooks cast for bigger fish. Fortunately for education proponents, Vice President Gore has vowed to keep the e-rate alive. One can expect the traditional Washington rounds of compromise and negotiation before a final e-rate solution comes to rest.

IDC does not forecast the e-rate funding cut to significantly affect K–12 IT spending, for two reasons. First, wiring classrooms is a top priority for most educators; thus, they will sacrifice spending in other areas to proceed with networking plans. Second, many schools have already made their purchases or have committed to purchases.

GENERATION NEXT: OPPORTUNITIES IN THE COLLEGE MARKET

IT vendors must view the college segment of the education market from two distinct perspectives: college students as IT consumers and college institutions as IT consumers. For obvious reasons, these groups have different needs and demands for IT products. Interestingly, the spending of students as a whole exceeds the spending of institutions. Students spent about $12 billion on IT in 1997; institutions spent about $9 billion.

HIP TO THE KIDS' SCENE

At first glance, it may be easy to dismiss the college market. The typical four-year student makes $7,000 per year — two-year students make somewhat more — and the student image may not be the first that comes to mind for most IT vendors when they think of high-prospect buyers.

However, students do have the backing of relatively affluent households ($66,200 average annual household income for four-year students; $44,000 for two-year students). Students also show a distinct need and demand for IT products, especially PCs.

On average, students spent about $800 each on technology products or services in the previous 12 months. Given 15 million college students in the United States, this equates to $12 billion in IT expenditures from the college student market.

Table 4 shows PC use and ownership among college students. The 55% total ownership exceeds the average ownership rate for U.S. consumers as a whole (43%). Among four-year students, 14% own laptop PCs, and 5% of two-year students own them. IDC estimates the laptop penetration in the overall U.S. consumer market to be about 5%. Thus, it appears that college students recognize the benefits of portable computing and are willing to pay a premium for it — not unlike many knowledge workers in U.S. corporations.

A majority of college students use e-mail (85% of four-year students and 41% of two-year students) and access the Internet (87% of four-year students and 57% of two-year students). Like their younger K–12 counterparts, this indicates that the large majority of college students will enter the workforce Internet literate.

TABLE 2
U.S. PC SERVER SHIPMENTS TO THE K–12 EDUCATION SEGMENT, 1997

	Shipments	Share (%)
Compaq	7,940	28.7
Apple	5,647	20.4
Dell	4,537	16.4
Hewlett-Packard	2,294	8.3
IBM	2,055	7.4
Others	5,208	18.8
Total	27,678	100.0

Messages in the Data:

Compaq is the clear leader in the PC server segment of the U.S. education market.

There will be a great opportunity for the other four players in the market to gain market share as a result of the e-rate program.

Source: IDC/LINK, 1998

TABLE 3
U.S. BRAND OF PCS INSTALLED IN K–12 SCHOOLS, 1997 (%)

	Share
Wintel/DOS	
IBM	16.3
Compaq	4.2
Gateway	2.1
Dell	2.0
Other	22.6
Subtotal	47.1
Apple	52.9
Total	100.0

Messages in the Data:

Apple is losing its once strong hold as leader of installed computers in K–12 schools.·

IBM is the dominant vendor in the Wintel/DOS segment of the K–12 PC installed base.

Source: IDC/LINK's *1997 K-12 Schools Technology Survey*

Roughly 20% of all college students indicated an interest in building a personal home page within 12 months. This trend indicates a growing acceptance of the home page as a communications platform among younger people. Many colleges are

encouraging students to develop home pages for social reasons and for posting attributes for review by prospective employers. Watch for the personal home page trend to permeate the mass market as current students graduate and enter "mainstream" society and as incoming students take their place.

INSTITUTIONALIZED

The total budget for computer systems, including equipment, support, and staff, averaged $2.4 million in 1997: $3.6 million at four-year schools and $553,000 at two-year schools. With 3,688 colleges and universities in the United States, IDC estimates the college market totaled nearly $9 billion.

A majority of college students use e-mail and access the Internet. Like their younger K–12 counterparts, this indicates that the large majority of college students will enter the workforce Internet literate.

Usually, computer hardware is a relatively minor portion of total computer system spending, which also includes support services, communications, and software. Two-year schools, however, spend a majority of their IT budgets on hardware, whereas four-year schools spend the largest share on support services.

The difference in spending allocation is in large part the result of the more sophisticated computer systems that four-year schools typically have in place. Larger systems invariably require more support and computer staff. The average number of full-time MIS/information service staff at four-year schools is 20, twice the average (9.6) at two-year schools.

Four-year schools and two-year schools vary on how they allocate their budgets. Figure 2 shows the budget breakouts for two- and four-year schools.

TABLE 4
FOUR-YEAR AND TWO-YEAR COLLEGE STUDENT PC OWNERSHIP AND PC USE AT SCHOOL (% OF RESPONDENTS)

Q: DO YOU CURRENTLY USE A PERSONAL COMPUTER?
Q: DO YOU OWN (OR LEASE) YOUR OWN PERSONAL COMPUTER?

	Total	Four Year	Two Year
Use PC at school	92.3	93.6	90.3
N =	1,504	1,204	300
Own PC	54.7	55.5	53.5
N* =	1,398	1,127	271

* N consists of PC users.

Source: IDC/LINK's *1997 U.S. Higher Education Market Study, Student Survey*

FAMILY TIME: CHILDREN'S INFLUENCE ON HOME IT PURCHASING

Children exert an influence in the IT market that extends beyond academia. In the consumer market, families with children represent lucrative targets for a variety of IT products.

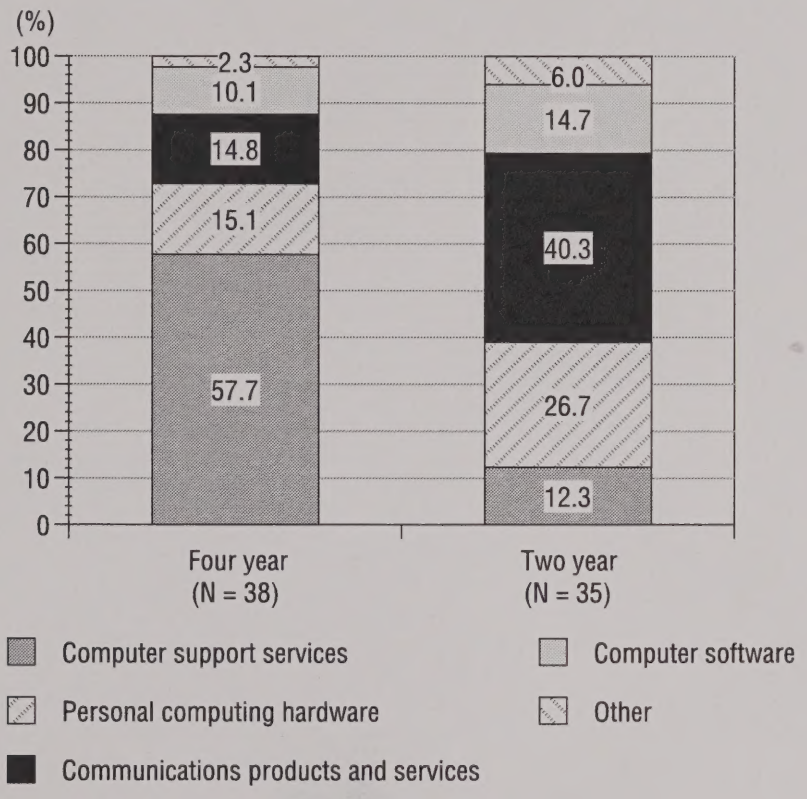
IDC labels these target households "Progressive Parents." Progressive parents are young (40 and 38 years old for males and females, respectively) and rather wealthy ($46,000 median household income); 80% have children younger than 18 at home. One-fourth of them are online, and they are above-average users of news, product information, and bulletin board services (BBS) or forums. Progressive parents exhibit very high interest in many kinds of media oriented toward children's education and entertainment.

Interestingly, Progressive Parents do not show much of an inclination to pay for goods and services online. Progressive Parents have the highest percentage of home PC ownership (59%).Their drawback is their low online penetration within this PC installed base. Only 42% of PC-owning Progressive Parent households go online (as stated above, that's 25% of all Progressive Parent households). Given the high PC penetration in this segment, we would expect a higher online penetration and more purchasing.

However, findings from IDC/LINK's *1997 U.S. Home Media Consumer Survey* indicate that this may change shortly. Progressive Parents show a willingness to pay for content, some

FIGURE 2
FOUR-YEAR AND TWO-YEAR COLLEGE ANNUAL IT OPERATING BUDGET COMPOSITION

Q. WHAT PERCENTAGE OF YOUR TOTAL ANNUAL (IT) OPERATING BUDGET IS ASSOCIATED WITH...



Note: N consists of MIS officers in charge of computer technology.

Source: IDC/LINK's *1997 U.S. Higher Education Market Study, Administrator Survey*

of which may be directly related to their children (e.g., health and entertainment content), as shown in Figure 3. Progressive Parents also exhibit interests in several online products and services that lend themselves to Internet commerce (e.g., video on demand and virtual record stores), as shown in Figure 4.

IDC believes that it is merely a matter of time before this demographic embraces the Internet and Internet commerce with open arms. In fact, we rate this demographic as the greatest opportunity in the consumer market as a whole.

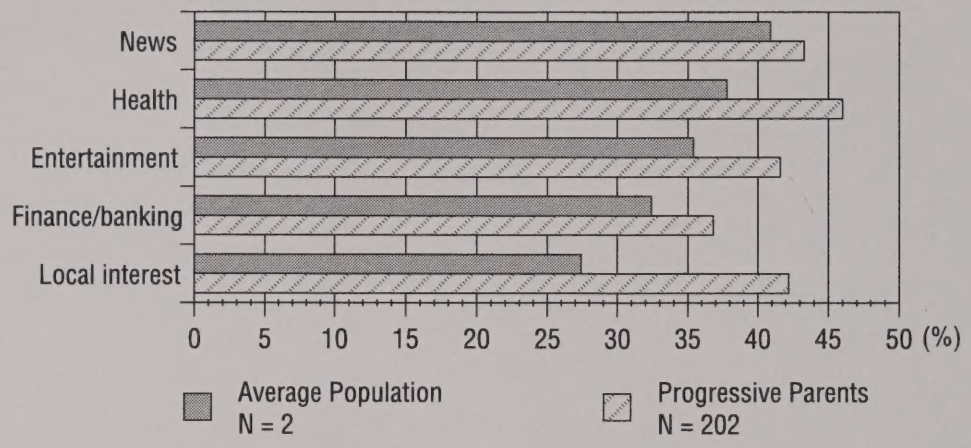
FOR WHOM THE SCHOOL BELL TOLLS

What do the findings from academia and households with children portend? In a relatively short time (perhaps five years), every person under the age of 25 will have had some exposure to the Internet, signaling total acceptance for the Internet as a primary communication platform.

IT vendors have a distinct opportunity to make money in enabling the education markets that are training future techno kids, and content companies can successfully shed the stigma that Internet information must be free information.

FIGURE 3
WHO'S WILLING TO PAY FOR CONTENT? PROGRESSIVE PARENTS VS. THE AVERAGE POPULATION

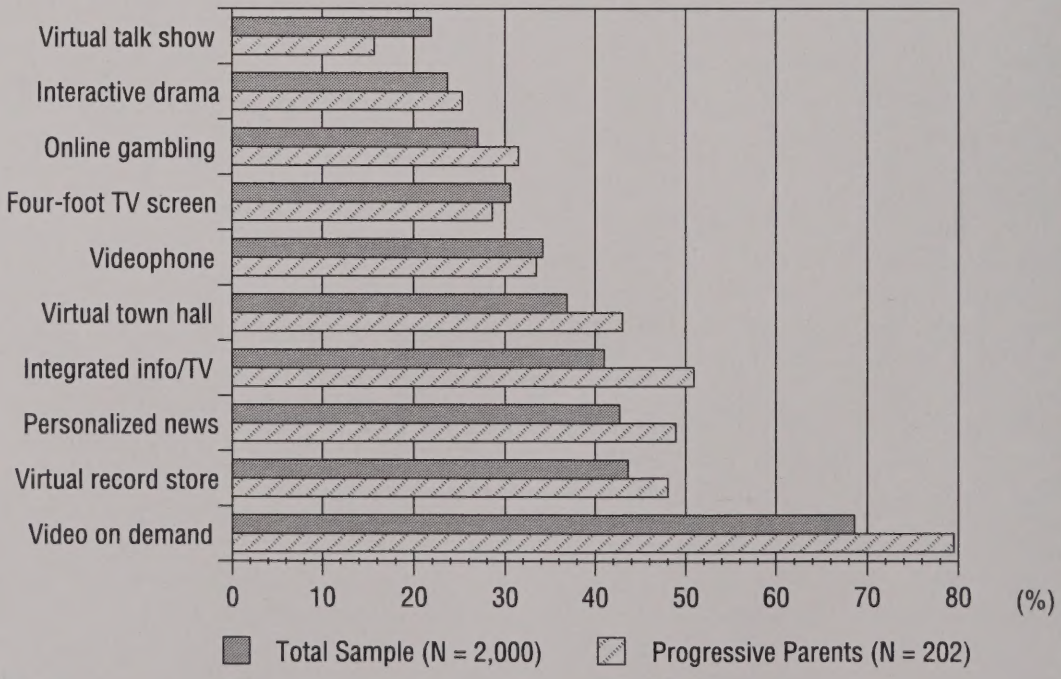
Q: How interested would you be in paying for the following information? (Scale of 1–5)



Note: Responses represent those answering 4 or 5.

Source: IDC/LINK's *1997 U.S. Home Media Consumer Survey*

FIGURE 4
PROGRESSIVE PARENTS' INTERESTS IN FUTURE ONLINE PRODUCTS AND SERVICES



Source: IDC/LINK's *1997 U.S. Home Media Consumer Survey*

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THE GRAY SHEET

IDC — IDC's forecasts of IT opportunities

Anatomy of a Cyber Sale: The Components of an Internet Commerce Transaction

In This Issue:

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May 1, 1998
IDC #16350
Vol. 33, No. 2–3

The prime benefit associated with Internet commerce is a case of dual efficiency: efficiency for customers to find and buy what they want and efficiency for sellers to conduct transactions and record sales data automatically and in real time.

The differentiator in Internet commerce solutions is the degree of efficiency they afford either party. This efficiency is grounded in the functionality the components of the Internet commerce solution provide.

What are the components of an Internet transaction, and who should care? A combination of technology solutions and business processes comprise each sale made on the Internet. Every corporate decision maker seeking to build or enhance a commerce presence on the Internet should care about the components of their transactions — as should most IT supplier corporate strategists who are looking to Internet commerce as the killer app for sustaining growth rates through the turn of the century.

The Internet transaction offers the Web seller opportunities to boost margins and reach new markets, but if the pieces of the transaction don't work smoothly, the Web seller faces security risks and (perhaps more threatening) consumer backlash. IT vendors that aim to offer total solutions (or even merely components of a solution) must understand the anatomy of the cyber sale because the transaction takes place at many levels of the enterprise system — from the desktop to the database.

So how do prospective e-merchants get up and running with a solution that fits their needs and their budgets, and where should e-commerce vendors target their wares?

Companies can implement an e-commerce solution in any of three ways: by purchasing a total Internet commerce solution from pure-play e-business providers like Open Market, Broadvision, Pandesic, or others; through implementing Web commerce solutions by selecting best-of-breed components and building a solution in-house; or by outsourcing the e-commerce business process to an ISP or commerce service provider (CSP). This double-issue Gray Sheet will briefly examine the benefits of building solutions as opposed to buying them and will explore the motivations behind either decision.

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The Gray Sheet is printed on 100% post-consumer recycled paper.

This newsletter profiles key players and product offerings in the following Internet commerce market segments:

- Web store creation tools
- Internet commerce servers
- Electronic commerce payment services

Future editions of *The Gray Sheet* will address two peripheral components also important to the e-commerce market — the configurator market and the Web security market.

Setting Up Shop: Storefront Creation Tools

From the buyer's point of view, the storefront is the shopping experience. The storefront displays the products and offers added information (including product descriptions, payment information, shipping information, etc.). Like a good salesman, the virtual storefront can be the deal maker or the deal breaker in the transaction — depending on how well it compels customers to make a purchase.

What counts as compelling? It depends on the customer the Web seller targets and the nature of the goods sold. In consumer sales, most Web sellers must explicitly define and describe their products to recoup the loss of the brick-and-mortar shopping experience. Graphics and multimedia presentations are tools retailers can use to aid in product descriptions. Customers can't kick the tires in a Web sale. Unless the product is one the buyer has purchased many times before, the Web seller must portray its attributes to the degree that the customer is confident enough to make a purchase.

In business-to-business (B2B) Internet commerce, however, product presentation may not play the key role it normally plays in consumer Internet sales. End users from commercial purchasing departments may rather see a detailed list of product specs and bulk pricing information than bandwidth-sucking graphics when they do their Web shopping.

Given the above, the essential function of a storefront creation tool is to provide the Web merchant with the means to display his wares for sale in the manner most relevant to his customers. Different storefront tools offer different levels of functionality, but all tools let the merchant design Web store pages in HTML (through templates or wizards) and upload graphics. The merchant uses the storefront creation tool to input payment terms, shipping costs, tax rates, and contact information, which customers will need during the purchase decision process.

Advanced storefront tools offer search engines, cross-selling tools, premium marketing and discounting tools, and customer-recognition features. These features enhance the customer's shopping experience and give the merchant added ways to maintain a one-to-one relationship with customers and prospects.

The storefront creation tool can act as more than a build-and-display tool. Merchants can use the storefront tool to gather useful information about customer buying patterns and Web-surfing habits. Most storefronts collect

customer data, which the merchant can print in report form or export to legacy databases for further analysis.

The storefront creation tool also acts as a conduit for future updates and changes to online inventory. Merchants use a standard Web browser to access the storefront tool and add inventory, change prices, or perform other routine maintenance. In most cases where merchants host their sites through a service provider, the storefront tool is used to upload legacy database data to the storefront.

Table 1 shows feature sets from three popular storefront creation tools.

Offerings in the Storefront Creation Market

INEX

Commerce Court from INEX is a storefront creation tool recommended by Compaq Computer as part of its Club Web Internet commerce strategy. INEX targets the small business segment with a storefront tool aimed at merchants that plan to outsource the hosting responsibilities for their Web stores; however, INEX's offerings will work with home-hosted commerce sites too (provided the site has the proper system requirements). INEX offers Commerce Court Lite and the more advanced Commerce Court Professional. (*The Gray Sheet* reviewed Commerce Court Professional for this profile.)

Merchants build their stores with Commerce Court's template-driven menus, which provide choices for background graphics and font size and placement. Merchants build the front pages of their stores by entering the company name and contact information, as well as a company description, through the Commerce Court setup wizard. Commerce Court assimilates premade graphics and company logos during setup.

Also during setup, merchants establish store management terms. They can assign up to 20 passwords for 20 distinct users, and they can limit the amount of access available to each user (some can access sales order information, some can access invoice information, and some can access payment information, or any combination of the above).

Like a good salesman, the virtual storefront can be the deal maker or the deal breaker in the transaction — depending on how well it compels customers to make a purchase.

At setup, the merchant must enter the starting invoice number for Web sales and must define payment terms (credit card flavors, C.O.D., etc.), tax rates, and shipping terms. Commerce Court offers several shipping terms, including fixed-rate shipping, linear percentage rate shipping, and destination-based shipping. However, if the merchant does not enter location-specific data for destination-based shipping charges, Commerce Court will be unable to determine the total cost of the order, and shoppers will receive a message to expect contact from a store representative.

INEX customers must rely on credit-card payment services supported by the host server, but this should not be a tremendous drawback. Microsoft's Site Server (the mandatory platform) supports a plethora of payment services through plug-ins.

Once the storefront is created, merchants have two options for stocking the cyber shelves: they can manually enter the inventory for sale or they can import it from legacy databases. With the shelves stocked, Commerce Court allows merchants the option to display featured items (which will appear on the store home page), include pricing promotions, and activate the cross-selling feature (grouping related products and linking to related pages).

Finally, Commerce Court gives merchants the option to export data to other software packages for further review and analysis.

The INEX solution — as with other remote-hosted commerce solutions — has some drawbacks attributed to the architecture. The merchant must dial in to the ISP or commerce host and download transaction data to a local PC. Commerce Court offers several reports so that merchants can analyze sales data (e.g., by tax code, by customer data, etc.), but it takes some effort for a merchant to export this data into a legacy program or to prep orders for fulfillment.

The company is working to automate the order retrieval process through an automated dial-up program. Most ISPs will not assume push techniques to

TABLE 1
STOREFRONT CREATION TOOL OFFERINGS AND FEATURES

		Features				
Product	Price	Customer Shopping Enhancements	System Requirements	Payment Gateways	Compatibility with Legacy Data	Marketing Features
INEX Commerce Court Pro	$995 client SW (enables 20 users); host SW is distributed free to CSPs	Shopping Cart	Client: Win 95 or NT, 16MB RAM, 30MB storage, standard Web browser; Host: NT server with ServicePack 3, Microsoft Commerce Server, SQL Database, 64MB RAM, 10MB storage	Whatever is used on Commerce Server	Supports import of text or binary files; imports some data direct from packaged applications with Import Wizard. Exports data in text or binary format	Cross-selling function, multiple product classification, out-of-stock substitution
iCentral ShopSite Pro	$1,295 client SW; requires proprietary host SW (price not available)	Shopping Cart, foreign language support, site search engine, multi-sku ordering	Client: Browser of choice; Host: Various Unix, Solaris on SPARC, Windows NT, IRIX (SGI); 16MB RAM, 25MB storage	First Virtual, CyberCash, Segue Systems	Imports binary and text data, some database formats; exports text data (tab delimited)	Automatic discount calculation, upselling tools
iCat Commerce Publisher Pro	$3,495 client SW; requires Carbo Server at host	Shopping Cart, site search engine, personal catalogs	Client: Win 95, NT, or Macintosh, 32MB RAM, 150MB storage; Host: Win 95 or NT, 32MB RAM, 150MB storage; also, Sun Solaris, SGI IRIX and HP-UX	First Virtual, CyberCash	Imports binary and text data, some database formats; exports text data (tab delimited)	Personalized catalogs, upselling tools, cross-selling tools, variable pricing

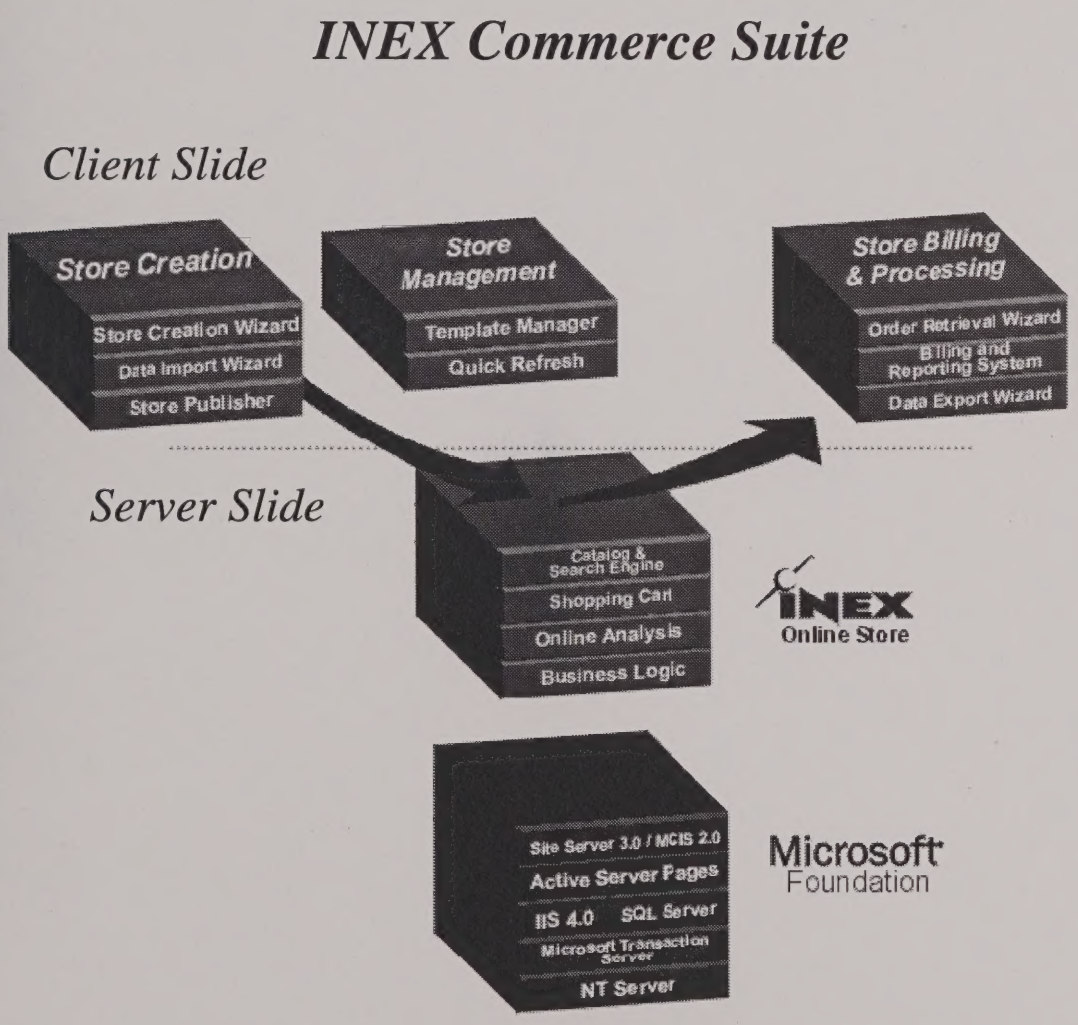
Source: International Data Corporation, 1998

deliver sales data to merchants because they do not wish to assume liability for sales lost in transit.

INEX also is working to find common APIs for exporting sales information into accounting platforms. This improvement will be available in future versions of Commerce Court. For the present, merchants must actively route transaction data to the appropriate back-office applications.

Figure 1 shows features of Commerce Court and the architecture. The system requirements for the Commerce Court client are minimal: Windows 95 or NT, 16MB of RAM, and 30MB of disk space, and a Web browser. The system requirements for the Commerce Court host (for ISPs or companies hosting their own sites) are more substantial. Commerce Court hosts require NT with Service

FIGURE 1
COMMERCE COURT



Some products in the INEX Commerce Suite do not contain all features

Source: INEX and International Data Corporation, 1998

Pack 3, Microsoft Commerce Server, Microsoft SQL Database 6.5 or higher, 64MB of RAM, and 10MB of drive space.

For merchants to protect their transactions with SSL (secure socket layer) encryption technology, the host site must install a digital certificate for the store's Web server and enable SSL.

The INEX Outlook

Commerce Court is an able solution for small businesses to get up and running with an Internet Commerce solution, especially if they can't afford the costs to set up Microsoft's Site Server in-house (more on that subject in subsequent sections of this report). Commerce Court Professional's price point ($995) is compelling.

To date, the company has about 100 sites that are live or about to be live with Commerce Court, for estimated revenue of less than $100,000 so far. INEX makes the host software available to ISPs and Web hosting companies at no charge, and the ISPs are acting as the primary channel for INEX's sales. INEX's early relationship with Compaq's Club Web is providing the company with good exposure.

The INEX solution is perfectly suitable for pure-play Web sellers who operate credit-card-based businesses. Commerce Court could be more robust if it offered automated invoicing for non-credit-card-based transactions and a more seamless integration with other back-office applications. Merchants who use ISPs to host their sites, however, will never enjoy real-time integration between Web sales and the traditional business applications.

iCentral

iCentral's ShopSite product performs a similar function to INEX's Commerce Court. ShopSite targets merchants who plan to design their Web store remotely and host it through an ISP or CSP. ICentral, recently purchased by e-commerce giant Open Market, offers a little bit more functionality through ShopSite than INEX does through Commerce Court, but ShopSite costs a little bit more. (The Gray Sheet profiles features included with ShopSite Pro.)

As with Commerce Court, merchants buy iCentral's ShopSite software and use a template-driven program to create the look and feel of their online store. Merchants enter product information into ShopSite's product database or upload it from a third-party database. Unlike Commerce Court, ShopSite software does not reside on the merchant's machine. Merchants perform all store development and catalog construction via browser on the host site.

ShopSite differentiates itself from Commerce Court in a couple more ways. First, it offers the shopper some added bells and whistles to ease the buying experience. ShopSite offers a site search engine (a huge benefit) to help consumers find what they're looking for without a lot of browsing. ShopSite also offers foreign language support.

The second way ShopSite differentiates itself is through its back-end features. ShopSite host software ships compliant with Segue Systems and CyberCash plug-ins; thus, merchants can use either of these payment verification options. ShopSite also offers merchants the option of using First Virtual, the payment gateway that also functions as a merchant acquisition bank for Internet credit card accounts. We assume ShopSite will integrate with Transact's payment services as well, now that iCentral is a subsidiary of Open Market.

ShopSite also stands out for its Orders CGI feature, which allows merchants to perform custom order handling (e.g., developers can program ShopSite to deliver order information to a fulfillment house in real time), and the SmartHTML feature proves convenient by allowing merchants to make a data change in the product database that is automatically updated on all the pages where the product is featured.

ShopSite does not require a transaction server as a platform (like Microsoft's Site Server). Instead, the ShopSite host software acts as the transaction server. The host software is Linux, Solaris, and Windows NT compatible and requires up to 25MB of disk space and 16MB of RAM. Merchants and shoppers, of course, need only standard browsers (3.0 or higher) to maintain the site or to shop there.

THE iCentral Outlook

iCentral's ShopSite offers a lot of functionality for its $1,300 price point. Forward-thinking Web merchants working in the sub-$1,500 price band will find much to like about ShopSite, but

with one caveat: added functionality like the Orders CGI interface requires more development savvy than many smaller Web merchants may have.

ShopSite has an installed base of about 1,400 stores. IDC estimates the license revenue from these stores to be about $1 million. ISPs and Web hosting sites act as iCentral's primary channel.

ShopSite, like other outsourced e-commerce solutions, will not prove feasible for larger businesses because of the asynchronous communication inherent in the dial-up architecture. Although the Orders CGI interface will help streamline the fulfillment process, it is not a substitute for a fully automated back office. However, for small-turn commerce sites, ShopSite is a good buy and should be strengthened in the future after its acquisition by Open Market.

iCat

iCat was one of the first true Internet commerce companies to rise to prominence, based on the strength of its catalog tools. It offers a store creation tool through its Commerce Publisher product. Commerce Publisher Pro is the iCat product providing the most functionality.

Commerce Publisher Pro composes four components — the database manager, the template manager, the catalog manager, and the sales manager. With the database manager, merchants can create or upload product information and implement marketing strategies (like cross selling and up selling). The template manager tool organizes layouts and plug-ins during the store design process. The catalog manager allows merchants to set up options and preferences and publish staging and live catalogs. The sales manager gives merchants customer information as well as the power to manage electronic orders.

Commerce Publisher Pro offers similar functionality to iCentral's storefront creation offering. One feature unique to iCat is the ability for several programmers to enter product data simultaneously.

iCat has expanded its business from the software realm to the services realm as well. Now prospective e-merchants can establish an Internet store through iCat's home page and make adjustments to their inventories through their browsers

System requirements are in line with the offerings from competitors: The client requires nothing more than Windows 95 or NT running a standard browser, 32MB RAM (64MB recommended), and 150MB of hard drive space. The store's host server (either in-house or outsourced through a hosting provider) requires the same specs listed above (for a Windows environment) or for several variations of Unix systems (refer back to Table 1). Merchants who implement a catalog with Commerce Publisher Pro must host it on a Web site using iCat's Carbo Server.

Commerce Publisher Pro (when used with Electronic Commerce Suite — as it must be) offers merchants CyberCash and First Virtual payment services offerings.

Price is an issue with Commerce Publisher Pro. Client-side merchant software is $3,495 — substantially more than the offerings from INEX and iCentral.

iCat Outlook

iCat has an installed base of about 2,000 copies of Commerce Publisher (many sold through its Commerce Suite solution), including some big names in e-commerce, for example Yahoo! To reach smaller and/or less tech-savvy institutions, iCat has expanded its business from the software realm to the services realm as well. Now prospective e-merchants can establish an Internet store through iCat's home page and make adjustments to their inventories through their browsers — without using purchased software.

iCat's quasi-hosting service (an iCat partner actually hosts the sites) raises interesting questions about the future of e-commerce in the small business segment. Although the modestly priced service may cannibalize some software sales initially, iCat sees its store-hosting service as a segue to increased sales of its more expensive Electronic Commerce Publisher Suite (including Electronic Commerce Publisher). Store designs and product catalogs are fully portable from iCat's hosted solutions to its software solutions.

Future issues of *The Gray Sheet* will examine the role of the commerce service provider in greater detail.

Serve One, Serve All: Commerce Server Profiles

The commerce server is that platform on which much of the electronic transaction magic takes place. Although the storefront creation tool establishes the look and feel of the site and provides the windows through which customers enter payment information, the data crunching occurs on the commerce server.

The commerce server market is where the real battle for Internet commerce dominance will take place. Microsoft and others are entering this fray with products aiming to challenge the high-end solutions offered by the pure-play e-commerce leaders. Two issues will play a major role in the outcome of this battle: Can "low-end" solutions that cost $10,000 to $15,000 for one server offer enough functionality and scalability to compete with the pure players? Will they have to offer advanced functionality to reach their target markets?

For many upstart Net entrepreneurs, a simple solution will suffice. For instance, in the boutique retail space, an Internet merchant may not need advanced back-office integration and support for advanced business rules found in best-of-breed, full-solution products from companies like Open Market or IBM.

For e-merchants, big factors influencing the build, buy, or outsource decision include the implementation and maintenance costs associated with commerce servers. ISPs and CSPs, also big customers for commerce servers, have to take into account scalability issues when they plan solutions designed to handle large numbers of merchants.

Commerce Server Product Offerings

Microsoft Site Server 3.0 Commerce Edition

Microsoft's Site Server Commerce Edition, more simply called Commerce Server, strives to offer total e-commerce functionality on the level of the more expensive pure players. Through what Microsoft calls "Pipeline" architecture, Commerce Server provides the stages required for processing orders.

The Commerce Interchange Pipeline accepts order data that the prospective customer types into the storefront page and routes the request to back-office inventory applications that signal if the product is in stock. If the user wishes to buy, payment data is routed to the appropriate payment gateway for authorization.

These functions sound a lot like the duties of the storefront creation tools in the preceding section — and in the cases of iCat and ShopSite, they are, because these solutions use their own proprietary commerce servers — but Microsoft's Site Server Commerce Edition goes beyond the abilities of storefront creation tools. Commerce Server allows developers to customize stages of the Pipeline to send order data directly to fulfillment applications and accounting applications in other parts of the enterprise. (These features come with one "buyer beware." Customization = cost because programmers/developers aren't free.)

Commerce Server offers several advanced marketing features that merchants won't find in storefront creation tools. Commerce Server gives merchants direct-mail marketing capabilities through push procedures aimed at users who register at a merchant's commerce site. The registration feature also offers merchants some access control; they can allow registered users to access parts of sites not available to the general public.

This authenticated log-in feature is vital to Commerce Server's supplier-hosted business-to-business solution because it allows merchants to create custom catalogs with volume pricing, but only makes these catalogs available to business partners, preferred customers, or members of the channel. Commerce Server also lets merchants accept custom payment solutions (e.g., purchase orders, C.O.D., etc.).

Commerce Server's Commerce Interchange Pipeline can facilitate the exchange of business data between partners through a variety of formats, including HTTP protocol, SMTP protocol, and EDI. The catch with this feature is that each partner must have an installed copy of Commerce Server on site.

Microsoft Commerce Server 3.0 has an advertising capability added above and beyond its

ability to process transactions. The Ad Server feature enables merchants to manage online ad campaigns through scheduling and industry standard reporting. Combined with the transaction capabilities of Commerce Server, Ad Server can use a technology called Buy Now to accept transactions directly through a banner ad.

Table 2 shows the system requirements and available pricing for the components needed to implement Microsoft's Commerce Server.

Outlook for Microsoft

Microsoft can approach the Internet commerce transaction server market from several angles. Its brand name gives it exceptional leverage, and its introductory costs are significantly less than the cost of some of the pure-play Internet commerce vendors.

The retail cost of a complete solution (for merchants who plan to host their commerce page at their business site) is less than $9,500. The solution includes one copy each of NT Server, SQL Database, and Site Server Commerce Edition, with a license for 25 users. Merchants expecting to do a significant amount of business on the Internet may opt for a package offering three copies of NT, one copy of SQL, and two copies of Site Server Commerce Edition (about $20,000 retail). Microsoft spokespersons indicated that discount pricing is available for qualified buyers.

Merchants can expect to serve anywhere from 100 to 800 current users on a commerce site hosted with one processor,

Table 2
Microsoft Commerce Server System Requirements and Pricing

System Requirements	Pricing
Microsoft Site Server Commerce Edition 3.0	$4,609 (25 Client Licenses)
For Intel and compatible systems	
System with a Pentium 100 or higher processor (Pentium 166 or Pentium PRO recommended)	NA
64MB of RAM (128MB of RAM recommended)*	NA
For RISC-based systems	
System with an Alpha processor 64MB of RAM (128 MB of RAM recommended)*	NA
Hard-disk requirements: 1GB required to install services plus additional disk space for content and user files*	NA
Additional requirements	
Microsoft® Windows NT® Server version 4.0 operating system and Microsoft Windows NT Server 4.0 Service Pack 3 or higher	$3,999 (25 client licenses)
Microsoft Windows NT Server 4.0 Option Pack	Included in NT 4.0
Microsoft Internet Explorer version 4.01	Free
Microsoft FrontPage 98® Web site creation and management tool	NA
Microsoft SQL Server or ODBC-compliant database**	$3,999 (25 client licenses)
CD-ROM drive Network adapter card	NA
VGA, Super VGA, or video graphics adapter compatible with Windows NT Server 4.0	NA
Microsoft mouse or compatible pointing device	NA

* Actual requirements will vary based on your system configuration and the features you choose to install.

** If you plan to operate a large site or choose to install Microsoft Commerce Server, use a SQL-based database management system such as Microsoft SQL Server™.

Source: Microsoft, 1998

depending on the degree that the site is integrated with large databases and other third-party software.

The appealing price point for Microsoft's solution tarnishes when merchants are faced with consulting services for integrating Site Server Commerce Edition with legacy systems. The cost for such consulting can range from $10,000 to hundreds of thousands of dollars.

ORACLE

Oracle offers merchants an Internet commerce solution that runs on Microsoft's NT platform and a plethora of Unix platforms. Like Microsoft, Oracle's ICS (Internet Commerce Server) processes transactions from end to end. ICS provides its own storefront creation tool and is compliant with CyberCash and VeriFone payment services.

Oracle differentiates its commerce solution through the network computing architecture (NCA). Oracle markets NCA as an open standard enabling ICS to communicate with any server on a network (be it Web based or client/server). Thus, a client/server data entry application could port data directly to ICS. This open standard is a combination of Internet standards like HTTP and Oracle's published APIs.

ICS offers merchants third-party APIs for inventory systems, order entry systems, payment systems, tax calculation, and shipping and handling calculation. It supports SSL 3.0 encryption, SSL certificates, and SET. Merchants can use ICS to stage commerce sites before bringing them "live" on the World Wide Web, and merchants can also retrieve in-depth reports about visitors and purchases.

Oracle also offers a separate product, Payment Server, to give merchants broader flexibility in accepting payments and integrating online orders into existing business systems. Payment Server handles credit card payments (redundant with ICS) and enables merchants to invoice customers or accept other forms of payment. Payment Server is configured to integrate seamlessly with ICS, but it is a standalone product that will work with other commerce servers too.

Oracle's $20,000 price tag may put it beyond the reach of smaller merchants, but its open architecture and numerous Unix offerings may make it the platform of choice for ISPs and other large Web commerce hosts.

OUTLOOK FOR ORACLE

Oracle's Internet Commerce Server bundle includes ICS (including plug-ins for CyberCash and VeriFone vPos), Oracle Web Application Server (the founding Web server platform), and Oracle 7.3.3 Database. The bundle costs $20,000 per processor. Payment Server costs an additional $10,000 per processor.

Oracle's $20,000 price tag may put it beyond the reach of smaller merchants, but its open architecture and numerous Unix offerings may make it the platform of choice for ISPs and other large Web commerce hosts. Spokespersons from Oracle claim the server software can handle an unlimited number of simultaneous shoppers, and the limiting factor for Internet traffic is the fault of processing limitations of the hardware platforms.

ELECTRONIC COMMERCE PAYMENT SERVICES

Electronic payment services are a combination of software and data communications services that play yet another integral role in the cyber transaction. These services route payment orders from the merchant's transaction server to the appropriate authorizing institution and on approval signal the merchant's acquiring financial institution to transfer funds to the merchant's account.

Commerce payment services software sits as a plug-in on the e-commerce transaction server. Merchants who host their sites through an ISP or Web host must choose a payment service that is compatible with the Internet commerce solution they've selected. The solution may require a specific payment service provider (e.g., iCentral's ShopSite works only with CyberCash, Segue, and First Virtual) or may allow custom coding to accept any payment service.

Just as storefront creation software and commerce servers differentiate themselves with functionality, payment services differentiate themselves through

their relationships with acquiring banks and the types of transactions they accept. Virtually all payment services accept credit card transactions; some accept micropayments (payments less than $10 that are captured through a distinct type of account), and some enable the merchant to implement business-to-business invoicing.

All merchants that accept credit cards for payment must open an account with an acquiring financial institution. The acquiring financial institution transfers the funds from the customer's credit card to the account established for the merchant. The merchant pays monthly fees and transaction fees for this purpose; thus, it is the merchant's best interest to use a payment service solution that gives him or her the best choice in acquiring institutions.

How Electronic Commerce Payment Services Work

When a Web shopper is browsing a merchant's site and decides to make a purchase, he or she clicks on the desired products in the electronic storefront. In most cases, the products are placed in a virtual "shopping cart" until the shopping session is done, then the consumer clicks on a button that says something to the effect of "buy now."

When the consumer indicates a decision to buy, the transaction server stimulates the payment service software, which sends the user a pay page. The pay page asks for payment information: name, address, credit card number, etc. The merchant's server then contacts the appropriate payment service server, which then contacts the appropriate financial institution, which authorizes the purchase. When the purchase is authorized, the payment service software contacts the merchant's acquisition bank, which transfers the appropriate funds into the merchant's account. The customer (in most cases) gets a return receipt via e-mail or receives a confirmation page on his or her Web browser. This process happens almost instantly.

Payment services come in two flavors: SSL or SET.

SET is considered a more secure means for transmitting electronic payment than is SSL. However, SSL data transmission is relatively difficult to break, and even though the merchant site gets access to credit card data, the customer is at no greater risk than if he or she gave a credit card to a waiter at a restaurant.

SSL is a means to securely transport the buyer's credit card information to the merchant site and then to the authorizing credit card institution and the merchant's acquisition bank. The credit card data can be stored on the merchant's server.

With SET, an electronic "SET wallet" on the buyer's machine transmits encrypted identification information via the Internet through the merchant's server (unseen) to the appropriate SET payment gateway at a payment service, which routes the still-encrypted information to an authorizing institution. The authorizing institution will notify the payment service if it is safe to continue the sale; if it is, SET software at the merchant's site will initiate the acquisition bank to transfer funds into the merchant's account.

Because with SET no one can see a customer's credit card information except the issuing bank and the customer, SET is considered a more secure means for transmitting electronic payment than is SSL. However, SSL data transmission is relatively difficult to break, and even though the merchant site gets access to credit card data, the customer is at no greater risk than if he or she gave a credit card to a waiter at a restaurant. SSL is more widely accepted among merchants because most customers will not set up the required wallet software for SET. However, the major credit card companies back the SET standard vehemently, and most electronic payment service companies support solutions for both SSL and SET.

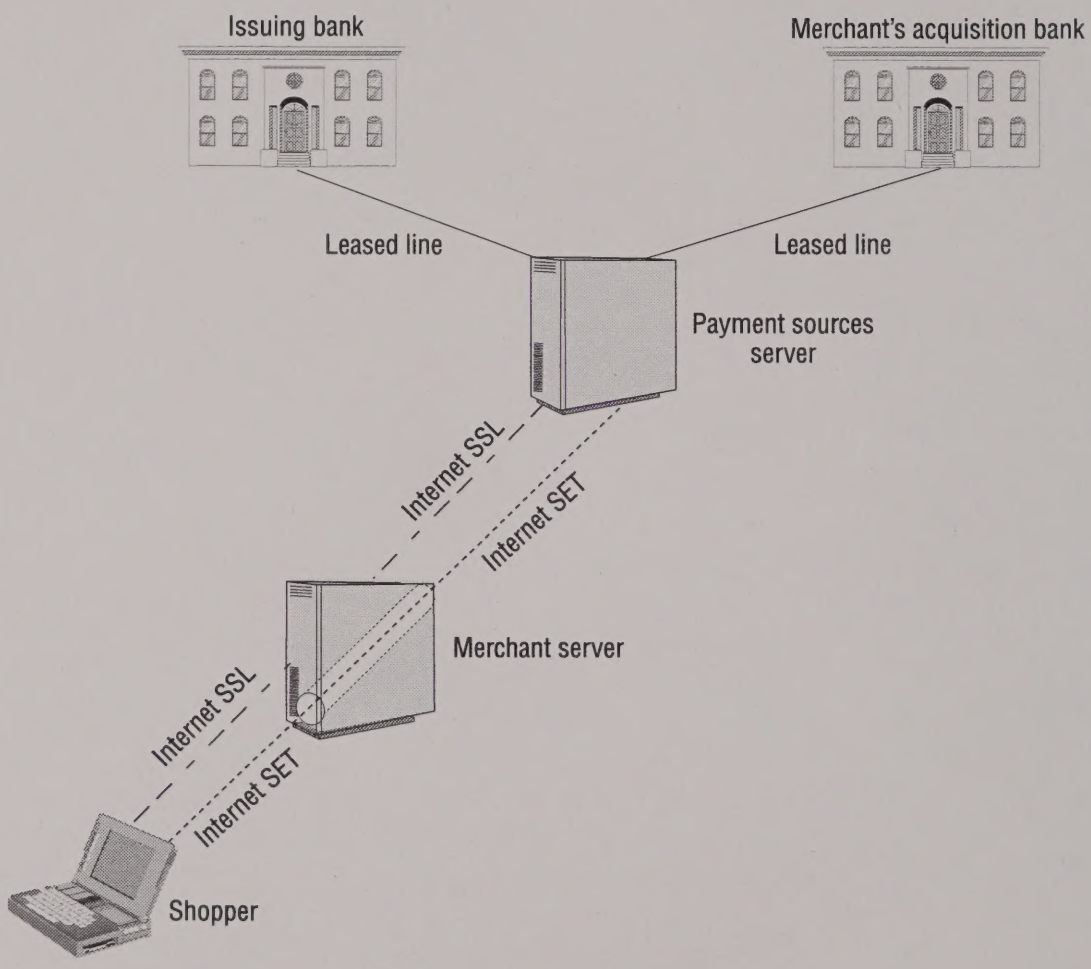
Figure 2 shows the data path for customer payment information during SSL and SET Internet transactions.

Offerings in the Electronic Commerce Payment Services Market

CyberCash

CyberCash is nearly a household name in the Internet commerce arena. Its first-quarter

Figure 2
Sales Verification Processes for Retail Credit Card Purchase on the Internet



Note: The above diagram shows the communications path in a typical retail purchase on the Internet. In SSL transactions, purchase information is passed to the merchant and relayed to the payment services company via an encrypted Internet message. The payment services company then routes the payment information to the issuing bank (typically through leased line) and the transaction data to the merchant's acquisition bank for settlement. SET transactions occur in similar fashion, but the buyer — using a digital wallet — sends encrypted payment information that passes *through* the merchant server to the payment server. The retailer never has access to the buyer's credit card number.

Source: International Data Corporation, 1998

revenues grew more than 700%, 1998 over 1997, and it recently completed a merger with another popular payment services company — IC Verify.

CyberCash brings strong offerings to the payment services table. It accepts several forms of payment: credit card transactions (in both SSL and SET), micropayments, and electronic checks. CyberCash has partnerships with more than 50 financial institutions that perform acquisition services.

CyberCash's credit card service, which works in the traditional manner of electronic commerce payment services as described above, costs merchants a one-time setup fee of between $300 and $800 and a monthly fee. Merchants pay the greater of two dynamics: 10 to 20 cents per transaction or a flat monthly fee of $40 to $70. CyberCash does not bill merchants directly; rather, it bills the acquisition banks — which in turn pass the charges on to the merchant.

CyberCoin, CyberCash's micropayment service, processes transactions of less than $10 — transactions that merchants would be unlikely to accept through credit cards because the transaction fee would be too high. With CyberCoin, consumers transfer funds into a "wallet," which is actually a CyberCoin bank account that transfers small amounts of money to a merchant's account when a CyberCoin user makes a purchase.

CyberCoin has a $995 setup fee and charges 10 cents per transaction plus 4% of the total sale. (For example, a five-dollar item would net CyberCash 10 cents plus 4% of five dollars.) The merchant is not required to pay additional discount rates or transaction fees to acquisition banks because CyberCash handles the funds transfer.

PayNow is CyberCash's electronic solution for billing systems. With a $50,000 setup fee and per-bill charge of 8 to 16 cents, the service is targeted at large businesses that can realize significant efficiencies by eliminating the costs associated with paper billing. CyberCash estimates it costs between 75 cents and 1 dollar in postage and handling costs for each bill a company mails.

CyberCash may be one of the best positioned players in the entire e-commerce arena. It garners a sliver of every sale transacted on the Internet through CyberCash.

The PayNow service is available only for merchants with preexisting relationships with their customers (utility companies and credit card companies are prime examples) because of the security implications involved with retail sales. CyberCash expects to offer PayNow services to retailers in the future.

Outlook for CyberCash

CyberCash may be one of the best positioned players in the entire e-commerce arena. It garners a sliver of every sale transacted on the Internet through CyberCash. CyberCash's ubiquity within the acquisition bank community and its popularity among e-commerce server/-application vendors make it a compelling choice for Internet merchants.

CyberCash also gains from the breadth of its offerings. Merchants can accommodate virtually every type of transaction through the CyberCash gateways.

CyberCash's revenue grew dramatically in 1997, from $127,000 yearend 1996 to $4.5 million yearend 1997. Unfortunately, expenses have increased in tandem, and the company is not turning a profit. IDC expects fortunes to improve as Internet commerce continues its precipitous increase.

VeriFone

VeriFone is an electronic payment service provider with a long history in the payment verification and transaction business. Incorporated in 1981, VeriFone began providing hardware and software to facilitate point-of-sale credit card verification and transaction services for a variety of industries, and its products are commonly found at supermarket checkout counters and fuel pumps.

The company is making the logical evolution into electronic commerce payment services. It sells Internet gateways to financial institutions so they can facilitate Internet commerce, it sells electronic wallets to consumers so they can perform secure transactions, and it sells point-of-sale software to sit on merchant commerce servers and facilitate online transactions.

vPOS is VeriFone's offering for merchants. It runs on Microsoft's Site Server Commerce Edition, Oracle's Internet Commerce Server, and Open Market's Transact solution. vPOS offers SET capability as well as SSL. It processes credit card transactions only.

vPOS offers features on par with other payment services, including different types of transactions like credits, voids, and reversals. The one major drawback for vPOS is that it must run on an NT-based transaction server. (A version compatible with HPUX will be available soon.)

Outlook for VeriFone

VeriFone needs to offer more payment alternatives if it is to compete with CyberCash, especially if it is to gain share with merchants selling in the business-to-business space. Also, the company will prosper with Web hosting providers and commerce service providers when it can expand from its NT-only offering.

These shortcomings can be overcome, however, and the VeriFone brand name (added to Hewlett-Packard's backing) should ensure continued success for the company when it rounds out its product offerings.

Compiling the Components: Should Merchants Build, Buy, or Outsource?

At Harvard University's recent International Conference on the Internet and Society, the focus groups on Internet commerce drew standing-room-only crowds, with technologists and merchants clamoring for information on real costs for doing electronic business. As the differing products and services above indicate, costs vary drastically, depending on the level of functionality incorporated in the solution.

Accordingly, the volume of business a merchant expects to generate should play a key role in the type of solution he or she employs. Also a factor is the degree of integration between the merchant's e-business and the brick and mortar operations.

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For example, merchants who are embarking on a virtual business without having a previous physical business and no existing IT infrastructure would probably be best served by outsourcing the process to a CSP. In this case, the merchant would pay between $1,000 and $4,000 for a storefront creation tool, the setup fee and monthly fees associated with an electronic payment service vendor ($500 to $800 and roughly 50 cents per transaction, respectively), the monthly ISP fees associated with Web and commerce site hosting (varies between $250 and $1,500, plus data transmission charges), and the monthly fees associated with a merchant or acquisition bank (roughly $100 per setup, a minor transaction fee, and a variable discount rate — usually about 2% to 3% of sales).

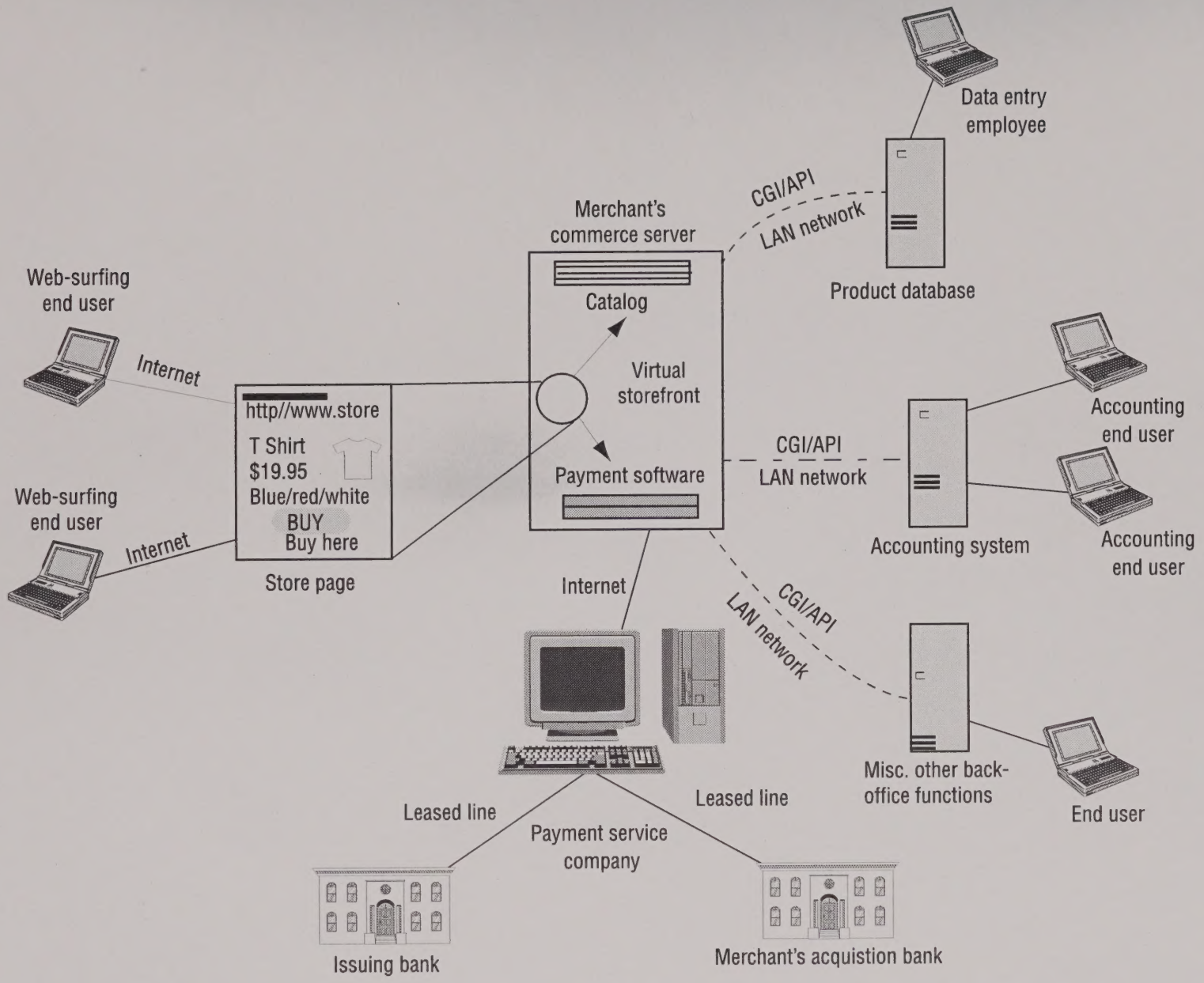
What's the approximate average bottom-line cost in this scenario? Roughly $3,000 in upfront costs, one dollar per transaction in miscellaneous fees, 2.5% of sales, and the applicable monthly site-hosting fee.

For established merchants, this scenario would reveal some significant shortcomings. The most significant might be the asynchronous transmission of sales data between the hosted site and the company's central office. As discussed in the section about storefront creation tools, merchants that outsource their sites have to dial in to retrieve orders and port the information into legacy systems either by hand or through some custom programming.

Figure 3 shows the components of an Internet commerce solution and potential tie-ins to back-office business functions.

Larger businesses or businesses expecting high volumes of Internet sales traffic may quickly decide they want to host their sites in-house. This solution facilitates real-time communication between Web sales and back-office systems. It also reduces fees associated with Web hosting. The question IT managers in these businesses must ask is the following: Is it cheaper to build a system from components or to buy out-of-the-box software from a solution provider?

FIGURE 3
COMPONENTS OF ELECTRONIC BUSINESS



Source: International Data Corporation, 1998

The typical solution provider, like an Open Market, Netscape, or Broadvision, will charge upwards of $100,000 for a complete solution. This charge may or may not include varying degrees of on-site consulting. The product will include pretty much everything a merchant needs to get started: storefront creation tools, transaction servers, and payment gateway software. Integration with back-end systems may require additional consulting, and advanced catalog or configurator tools may cost extra.

The picture gets even murkier for merchants who decide to build their own Internet commerce systems. After buying the server and store builder and setting up the payment service, the merchant has probably spent about $20,000 (for a limited site). But the costs are only beginning. IDC research indicates personnel and consulting account for 64% of the cost associated with implementing a commerce site. If the merchant spent $20,000 in systems and software, he or she could expect an additional $55,000 in personnel and services costs.

What's the best conclusion prospective e-merchants can draw about developing their Internet commerce site? Take stock of the human resources at hand, including the available budgets and anticipated goals. Then implement the process that best fits their capabilities.

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THE GRAY SHEET

IDC's forecasts of IT opportunities

Federal Internet Policies: Laissez Faire Or Fairly Lazy?

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April 1, 1998
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The technology policy situation in the United States is beginning to look like a scene from a familiar Walt Disney movie. The Internet is starring as Peter Pan (the boy who won't grow up), and the U.S. government is starring as Captain Hook (the villain who wants to end Peter Pan's free-wheeling revelry).

The IT industry and the feds will have a few good old-fashioned sit-downs in the chambers of the Supreme Court and on the floors of Congress in 1998 to discuss topics ranging from Internet service provider (ISP) regulation to Internet sales tax to encryption.

The government, rightfully claiming the Internet is no longer a baby, wants to protect its key interests: taxation and security. The IT industry, staffed with techies and cyber punks, argues the government should stay out of an institution whose success largely is characterized by the contributions of independent individuals.

Inevitably, some of the U.S. government's efforts will be better than others as it attempts to legislate an entity that quite possibly is too large to govern effectively from the seats in one nation's capital. But love it or leave it, the policies that eventually govern the Internet (or will exempt it from governance) will be based in several judicial and legislative actions:

- Representative Cox's Internet Tax Freedom Act
- The FCC's Enhanced Service Provider protection regulation
- Bernstein versus Department of Justice
- Goodlatte et al.'s Security and Freedom Through Encryption Act of 1997 (S.A.F.E.)
- The McCain-Kerrey Bill

This issue of *The Gray Sheet* examines the above actions to determine their potential effects on the development of the Internet and Internet commerce in the near term.

A Taxing Ordeal

Congress Is Charged With Sorting Out The Internet Tax Dilemmas

For every efficiency Internet commerce creates from a business perspective, it creates a corresponding quandary for tax officials. Who has the right to tax? How much can a jurisdiction tax? How can Internet taxes

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be enforced? Should Internet sales be taxed at all?

The Internet's growth as a commerce platform has outpaced the United States' ability to legislate this platform, creating excitement among buyers and sellers but fear among the ranks of local governments. Internet commerce offers nearly seamless transmission of goods to customers but little way for governments to extract a tax on the transactions.

At first, Internet commerce was too small to be a concern for local authorities, but its growth in the past 12 months has given governors and mayors cause for alarm. The Clinton administration's Framework for Global Electronic Commerce, released in summer 1997, exacerbated the issue by verbalizing the federal government's resolve to keep the Internet duty free.

What resulted was political outrage from the nation's coalitions of governors and mayors, and suddenly Internet taxation is a matter of public agenda.

On average, sales taxes make up 23% of state revenues. How much of a bite will lost taxes from Internet commerce take out of that 23% if it remains unregulated? It's hard to say. IDC forecasts Internet commerce (directly over the Web) to be $212.8 billion in the United States in 2002. This would be about 2% of total GNP based on IDC estimates (see Table 1).

Given the average rate of sales tax in the United States (4.75%), the $212.8 billion Internet commerce economy (in 2002) represents more than $10 billion to be split among the states that collect a sales tax — if they can get permission to tax it.

What Are The Party Lines?

At press time for this edition of *The Gray Sheet,* a proposal to address the Internet tax issue is making its way through Congress. The Internet Tax Freedom Act, championed by Representative Christopher Cox (R), proposes some specific actions and moratoriums to minimize federal government intervention and to keep state and local governments from being left out in the cold altogether.

A complete summary of the Internet Tax Freedom Act is available on the House of Representatives Web site at **www.house.gov/chriscox/net-tax.** In brief, the act proposes a series of things, as discussed in the following sections.

Protection For ISPs

First, Cox's act calls for a three-year ban on taxing Internet access or online services. (The three-year ban is a compromise from his original plan of six years.) The Internet Tax Freedom Act declares that because Internet service providers may house their corporate offices in one state but provide services to many different states by maintaining server POPs (points of presence), it is nearly impossible for governing bodies to determine which state is entitled to levy the tax — leaving the Internet exposed to double taxation. The bill also states that states have no clear way to define Internet service (e.g., as a telecommunications

TABLE 1
A MATTER OF PERSPECTIVE: INTERNET COMMERCE AND THE U.S. ECONOMY, 1997–2002

	1997	1998	1999	2000	2001	2002
GNP* ($B)	8,019.6	8,420.6	8,841.6	9,283.7	9,747.9	10,235.2
Internet Commerce ($B)	6.7	18.2	36.3	69.5	121.3	212.8
% of GNP	0.1	0.2	0.4	0.7	1.2	2.1

* Forecast of real GNP is based on *The World Almanac Book of Facts* and IDC estimates.
Source: International Data Corporation, 1998

service, as a data processing service, as an information service) — leaving the Internet exposed to inconsistent taxation.

Cox further argues that the Internet's distributed architecture and packet-switching technique for delivering data make it impossible to measure where data transmissions begin and end and which boundaries they cross, especially when this architecture is complicated further by portable computer users, who may dial in from a plethora of municipalities other than the state in which they are registered to receive Internet service.

What's a poor local government bureaucrat to do (see Figure 1)?

Opponents of the Internet Tax Freedom Act (at least the section pertaining to ISPs) may argue that ISPs should be no different from other telecommunications companies when it comes to managing their billing and tax accounting ledgers. Cox defends the ISPs by explaining that most are mom-and-pop organizations that would be driven out of business if sweeping government mandates forced them to implement complex accounting procedures to satisfy tax compliance.

Both sides make a good case. By not taxing ISPs, federal, state, and local governments collectively are saying that ISPs are entitled to a tax exemption withheld from telephone companies and other communications providers. If governments do tax ISPs, undoubtedly some of the nation's 3,000+ ISPs will go bankrupt under the burden of developing a billing and accounting system to keep track of the taxes their subscribers owe to their respective states.

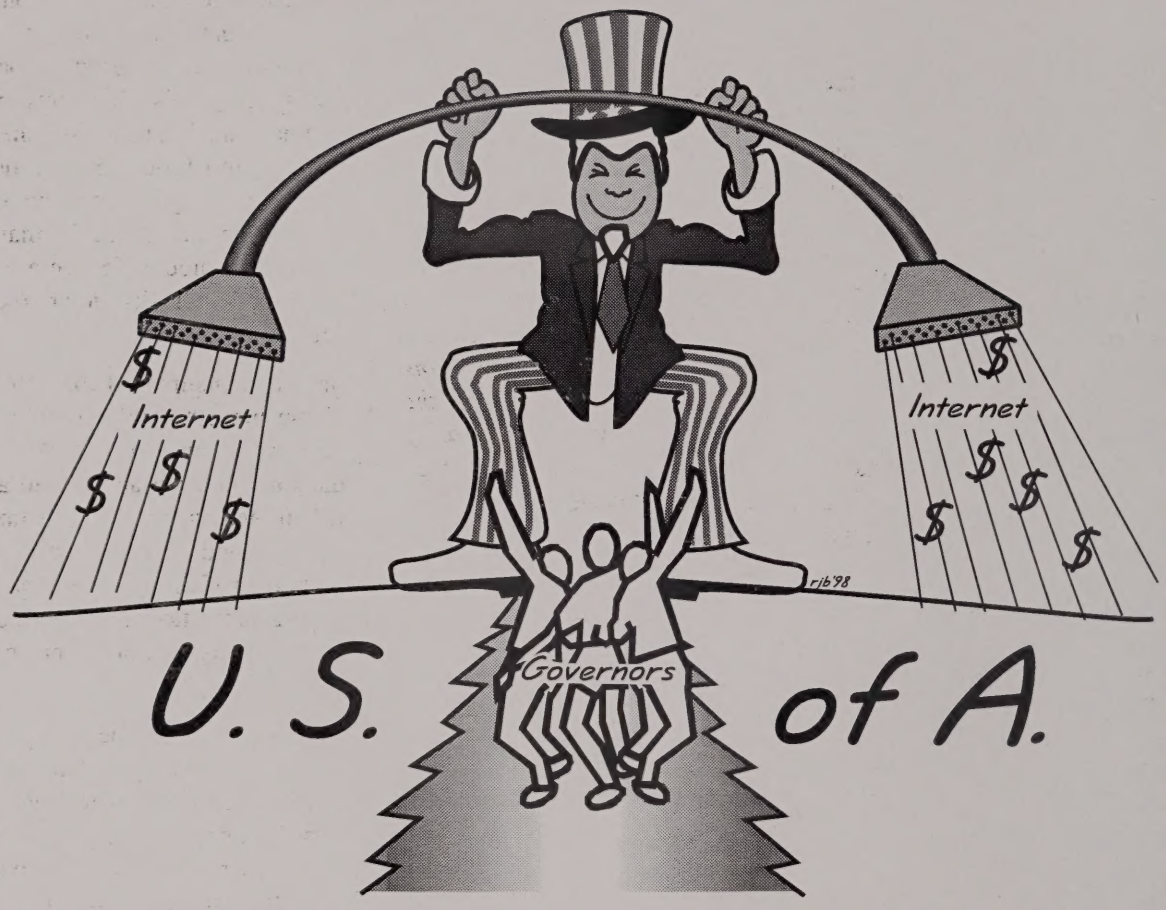
Oddly enough, the solution to the dilemma may not be found in the Internet Tax Freedom Act at all. It may come from the FCC. The ISPs and the FCC have a dirty little secret seldom written about in pro-IT publications: Local telephone carriers are towing part of the ISPs' weight. ISPs are protected from paying local access charges to regional Bell operating companies (RBOCs) and competitive local exchange carriers (CLECs) because the FCC passed some complicated regulations granting ISPs immunity because they are in an infant industry. These regulations are summed in the FCC's Enhanced Service Provider protection regulation.

However, the ISP tax debate may be the event to bring the free ride to a halt. Many ISPs may not have the infrastructure to measure traffic and apply appropriate taxes, but the local phone companies do. One RBOC, Pacific Bell, proposed a 60-cent-per-hour fee for ISPs connecting to its local switches. Based on measured connection times through the RBOCs, state and local governments could assess appropriate taxes on ISPs — which they could then pass on to end users.

ISPs and Internet watchers claim that 60 cents per hour is too high a fee for the baby Bells to collect, and for now the FCC agrees. But how long will the protection last? Table 2 shows the effects of the 60-cent fee in several end-user scenarios. State and local governments could tax all or part of that fee.

Local access fees could mark the beginning of the end for fixed-rate Internet services sub-

FIGURE 1
FEDERAL INTERNET TAX INITIATIVES IN THE UNITED STATES: UNCLE SAM SAYS "HANDS OFF" TO MUNICIPALITIES AND STATES



Source: International Data Corporation, 1998

TABLE 2
WILL FEES ON ISPS ADD UP?

Type of User	Business*	Casual Consumer	Average Consumer	Avid Consumer
Tax rate ($ per hour)	0.60	0.60	0.60	0.60
Average hours per month	240	7	24	47
Cost per month ($)	144.00	4.20	14.40	28.20

* Business use is based on one dial-in port used 40 hours per week. This number can fluctuate based on the number of end users and average length of online sessions. It disappears for businesses that do not use dial-in Internet access.

Source: IDC/LINK's *1997 Home Media Consumer Survey* and IDC's *The Gray Sheet*

scriptions. Whether the end of the all-you-can-eat style of Internet service will hamper the continued growth of the Internet in the United States is a subject of debate, but if states join the legions of RBOCs and C-LECs in pressing for the end of the ISPs' local access charge protection, it could behoove the ISPs to find a proactive solution to the tax dilemma.

What About Commerce Taxes?

The Internet Tax Freedom Act does not preclude taxes on sales or services transacted on the Internet, as long as the states impose such taxes under the same auspices as they would impose sales tax on other types of transactions (e.g., mail order). The bill does call for a congressional study to determine how to tax commerce on the Internet (and simultaneously investigate the practices governing mail-order sales).

Representative Cox vehemently declares his bill is not intended to give preferential treatment to Internet sales, only to prevent Internet sales from discriminatory taxation. Cox does not want state and local authorities to tax the Internet any more than they would tax a traditional retail transaction or mail-order sale.

On the Internet Tax Freedom Act home page, Cox clarifies his Internet commerce intentions for the bill as follows:

Under the bill, products taxable in a store or in a catalog would remain taxable on the Internet. The bill is aimed at preventing discrimination against the Internet, not giving it a tax preference. In fact, the bill expressly preserves the authority of state and local governments to impose sales and use taxes on products and services that would be taxed, provided that the tax does not discriminate against the fact that it's being delivered via the Internet as opposed to more traditional means.

If anything, given general tax uncertainties and the aggressive theories of "nexus" being advanced by state tax collectors, the administrative burdens facing sellers of goods over the Internet are significantly greater than those that face someone selling goods in a retail store.

What Cox fails to do (as does everyone else) is provide insight into the failings of the mail-order tax model when it is applied to Internet commerce. In short, the capabilities of technology undermine the precepts of mail-order taxes, which is one issue to be addressed in the congressional study Cox is proposing.

The rules governing taxation of mail-order goods date back to the U.S. Constitution and were created to keep the states out of the interstate taxation business. (Our nation's founders felt interstate taxation was a chore best suited to the federal government.) States have the right to levy taxes on businesses only if they have a nexus, or physical point of presence, inside state lines. Nexus was traditionally defined as a physical storefront or office containing salespersons or staff. Defining a physical presence for Internet sellers could be limited solely to the state in which they house their product servers.

At the consumer level, buyers pay tax (on taxable goods) in the state where they make a purchase (if the state charges tax), and they are supposed to pay taxes on goods they buy in another state but bring into their home state (through mail order or by physically transporting the goods). Here is where the mail-order tax model for Internet sales really breaks down (see Figure 2).

Say a consumer from New Hampshire (0% tax) is traveling to Pennsylvania (6% tax) and dials in via a portable PC to an ISP in Massachusetts (5% tax) to buy goods from a Web site housed in California (6% tax). Who gets the tax? That depends on the interpretation of current mail-order laws.

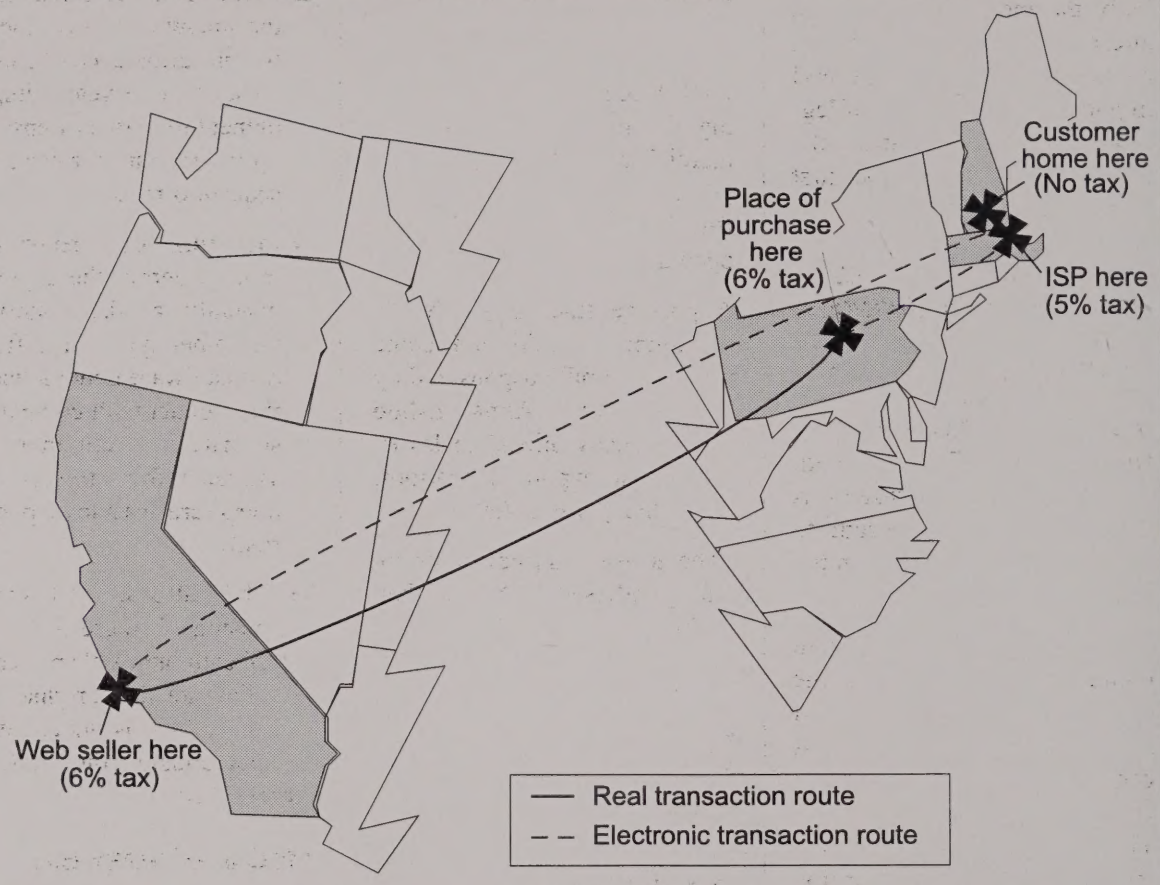
Consumers won't be the only segment of the population to throw up their hands in frustration if states start applying sales taxes pell-mell. Web sellers will find themselves investing in costly accounting software to reconcile the myriad combinations of taxes.

When international taxes and tariffs are added to the mix, the picture only gets worse. Cox's bill calls on the Clinton administration to lobby foreign governments to keep the Internet tax free for the time being.

Deciphering The Encryption Problem

At the moment, the encryption problem may be of little importance to the vast majority of U.S. Internet users who log on for an average of about an hour

FIGURE 2
INTERNET COMMERCE: EFFICIENT TRANSACTIONS = A TAXATION NIGHTMARE


Customer home here (No tax)
Place of purchase here (6% tax)
ISP here (5% tax)
Web seller here (6% tax)
Real transaction route
Electronic transaction route

Note: The digital world has no regard for geography. A "real" transaction occurs between NH, where the customer lives, and MA where the ISP is. The geographic location the ISP recognizes for billing this customer is NH. A "real" transaction also occurs between PA and CA — where the customer "is" and where the goods originate.

Source: International Data Corporation, 1998

each day to send e-mail, read the news, and study up on product information for upcoming purchases. However, the problem is of pressing importance to U.S. software companies and Web sellers, and they are collectively screaming loudly about it.

What's the problem? The U.S. government has prohibited the publishing and exportation of really strong encryption products (i.e., 128-bit, private-key encryption) in the interests of national security. Because this encryption is virtually unbreakable, the Justice Department argues that it will be unable to deter criminal behavior. The Feds believe plots and schemes to undermine national security will survive unabated if law enforcement agencies can't crack codes and investigate e-mails and other forms of electronic communication.

IT companies claim the U.S. government's tight control over encryption is useless and harmful because 128-bit encryption is widely available in other countries; thus, if criminals and terrorists want to secure their electronic messaging, they already have the capabilities to do so. Furthermore, the software companies argue that their ability to conduct trade is limited because international companies will not buy American-made encryption products if stronger products are available elsewhere.

National security is a value close to the hearts of most Americans, but so is the right to competitive trade. Not surprisingly, the encryption debate has already earned time in federal courts and Congress. Several important cases and acts of legislation will directly affect the encryption debate in the first half of 1998.

Bernstein Versus The Department Of Justice

The first standout court case to center on the encryption battle is Bernstein V. D.O.J., in which University of Chicago math professor Daniel Bernstein is suing the D.O.J for the right to post his encryption code on the Internet.

Bernstein is prevented from publishing his code on the Internet by the Export Administration Regulations passed down from the Bureau of Export Administration (BEA). The BEA reviews IT vendors' requests to export encryption software on a case-by-case basis and grants specific licenses to companies that meet the BEA's requirements. The BEA found Bernstein's encryption code was more powerful than the regulations permit and determined that if he posted it on the Internet, he was exporting it by default.

Bernstein fought the injunction preventing him from publishing his code because he determined his freedom of speech was being limited. He won twice in the lower courts, and his case is being heard in the U.S. Court of Appeals. Preliminary indications from the judges on the appeals panel indicate a favorable finding.

However, even if Bernstein is allowed to publish his code, the finding will likely be written within the scope of protecting First Amendment rights, meaning the rules governing commercial export of encryption products will not be changed. But the finding would at least open the door slightly.

A positive finding for the IT community would add some muscle to a bill cosponsored by Representative Anna Eshoo (among many others) to lessen encryption export regulations, called the S.A.F.E. Act.

"The decision in [the] Bernstein [case] underscores the fact that, in the name of national defense, the U.S. government should not restrict the very liberties it is supposed to be defending," Eshoo said in a statement quoted by C|Net, the online news service.

S.A.F.E. Act

The S.A.F.E. Act (Security and Freedom Through Encryption Act of 1997) is a pro-industry action circulating in the House of Representatives. The bill — the full text of which can be found on the House of Representatives home page (**www.house.gov/goodlatte/enc_sum.htm**) — seeks to accomplish the following:

- Give all Americans the freedom to use any type of encryption anywhere in the world and allow the sale of any type of encryption domestically
- Prohibit the government from creating a back door into peoples' computer systems (mandatory key escrow)
- Create criminal penalties for the unlawful use of encryption in furtherance of a crime — up to five years' imprisonment for a first offense and up to 10 years for each subsequent offense
- Modernize U.S. export controls to permit the export of generally available software and other types of software and hardware under a license if a product with comparable security is commercially available from foreign suppliers (creates a level playing field)

This bill, although still subject to revisions, is more friendly to the IT community than a corresponding act that originated in the Senate and is under review simultaneously (the McCain-Kerrey Bill).

McCain-Kerrey Bill

The McCain-Kerrey Bill earned much criticism from the technological community for several distinct points. It approved export controls, procurement requirements, and a federal licensing system for certificate authorities (CAs), a security procedure that "authorizes" a person's identity on the Net.

The Senate revised the bill to attempt a compromise between industry and enforcement officials, but even the revision continues to draw criticism. The Center for Democracy and Technology (**www.cdt.org/crypto**), perhaps the most ardent watchdog group for the McCain-Kerrey Bill, finds fault with the

revised initiative for the following reasons:

- Push to key recovery. The revised bill still uses a series of incentives to require or encourage encryption users to surrender their keys in accord with government standards:
  - Procurement. In an effort to influence the non-government marketplace, the bill still requires federal computer systems, as well as many federally funded systems, to adopt key recovery designed not for security, but for ready investigative access. This places government systems at risk because key recovery is not appropriate for all applications, even in government.
  - Safe harbors. Very broad protection from immunity will make it unlikely that any entity would want to become a key recovery agent without meeting government key recovery requirements. Such large giveaways to recovery agents also raise serious consumer issues.
  - Export relief linked to key recovery. Producers of encryption can obtain export relief if they install key recovery features meeting government standards.
  - Privacy standards. Though better than a subpoena, the court order standard based on mere "relevance" is still not sufficient for sensitive keys. The bill also includes no minimization requirements for recovery information in domestic investigations.
- Export controls. The current 56-bit limit and key recovery exemptions are retained. In addition to codifying a bad standard, this bill would be a major setback for ongoing litigation aimed at challenging encryption controls.
- Broad criminal penalties. The new bill retains S. 909's 15 federal crimes pertaining to encryption, including the sweeping "unlawful use of encryption" crime penalizing "whoever knowingly encrypts data or communications in furtherance of the commission of a criminal offense." This new crime threatens to chill the routine use of encryption due to the risk of severe penalties. It applies to state crimes as well, effectively federalizing a vast number of investigations.
- CA regulation. There is no consensus today on the proper shape of federal CA regulation; this effort appears both premature and profoundly anti-market.
- Broad waiver authority. The president can waive any provision of the bill (except Title I) "in the interests of national security, or domestic safety and security." (Title IX)

Can Government And Industry Find A Compromise?

Clearly, any resolution to the encryption debate will affect the development of worldwide Internet commerce, although the extent of the effect is difficult to measure now. Despite the need to foster commerce, however, elements of national security must be considered in the ultimate encryption compromise.

The Gray Sheet believes the best compromise may hold the following elements:

- Keys should remain private and not be held in public escrow. Netizens should be free to conduct their business and communications without anxiety that a "big brother" figure is monitoring their day-to-day interactions.
- Export restrictions should go away. Given the proliferation of more powerful encryption technologies worldwide, preventing the export of strong encryption is only hampering the competitiveness of U.S. software companies.
- Despite the protests of the CDT, a court order stronger than a subpoena (as detailed in revised McCain-Kerrey) could be a reasonable barrier for the government to meet if it finds the need to retain a Web user's private key.

Even if government and industry adopt the above suggestions and reach a reasonable compromise, changes in technology will make the encryption battle a continuous issue. But without such a compromise, the Internet commerce issues discussed at the beginning of this newsletter may become moot.